

5.1 LAND USE

WAC 463-42-362 Built environment – Land and shoreline use.

(1) The relationship to existing land use plans and to estimated population – *As part of the application, the applicant shall furnish copies of adopted land use plans and zoning ordinances, including the latest land use regulation and a survey of present land uses within the following distances of the immediate site area:*

- (a) In the case of thermal power plants, twenty-five miles radius;*
- (b) In the case of petroleum refineries ten miles radius;*
- (c) In the case of petroleum or LNG storage areas or underground natural gas storage, ten miles radius from center of storage area or well heads;*
- (d) In the case of pipe lines and electrical transmission routes, one mile either side of center line.*

(2) Housing – *The applicant shall describe potential impact on housing needs, costs, or availability due to influx of workers for construction and/or operation of the facility.*

(3) Light and glare – *The applicant shall describe the impact of light and glare from construction and operation and shall describe the measures to be taken in order to eliminate or lessen this impact.*

(4) Aesthetics – *The applicant shall describe the aesthetic impact of the proposed energy facility and associated facilities and any alteration of surrounding terrain. The presentation will show the location and design of the facilities relative to the physical features of the site in a way that will show how the installation will appear relative to its surroundings. The applicant shall describe the procedures to be utilized to restore or enhance the landscape disturbed during construction (to include temporary roads).*

(5) Recreation – *The applicant shall list all recreational sites within the area affected by construction and operation of the facility and shall then describe how each will be impacted by construction and operation.*

(6) Historic and cultural preservation – *The applicant shall list all historical and archaeological sites within the area affected by construction and operation of the facility and shall then describe how each will be impacted by construction and operation.*

(7) Agricultural crops/animals – *The applicant shall identify all agricultural crops and animals which could be affected by construction and/or operation of the facility and any operations, discharges, or wastes which could impact the adjoining agricultural community.*

5.1.1 Existing Conditions

5.1.1.1 Land Use

Section 463-42-362 of the *Washington Administrative Code* (WAC) does not specify the land use survey distances for wind power projects; however, for electric transmission routes, one mile on either side of the center line is specified. That is also an appropriate distance for wind generation projects, given that they, like transmission lines, are above ground and extend over substantial area. Therefore, the study area for this land use analysis is the acreage located within one mile on either side of the wind turbine strings.

The Project would be located in central Kittitas County, northwest of the City of Ellensburg. The general study area is characterized by a hilly rural landscape of rangeland with some scattered residences. The overall population density in the area is low. There are approximately 60 dwellings within one mile of the proposed Project. Many of these are not permanent or full time residences but rather are seasonal cabins. There are approximately 7 residences within the immediate Project area; all but one of them have signed option agreements with the Applicant. Land use in the entire study area consists of open space and cattle grazing. Forest cover exists to the north of the Project but there are no commercial forestry operations taking place in the immediate vicinity of the Project. There are no Conservation Resource Program (CRP) lands, prime soils, or aircraft flight paths in the study area. Seasonal hunting is allowed on some parcels with landowner permission.

Additional land uses in the area include:

- A commercial gravel quarry on Highway 97 just south of the northern junction with Bettas Road operated by Ellensburg Cement Products;
- An inactive gravel quarry on Bettas Road north of the junction with Hayward Road owned by the Washington Department of Transportation;
- Five sets of BPA electric transmission lines running east to west across the Project area, divided into one group of four near the middle of the Project and one to the north;
- One set of Puget Sound Energy electric transmission lines running east to west across the Project area just north of the southern set of BPA lines;
- Three communication towers;
- Two state highways: Highway 97, running through the middle of the Project area, and Highway 10 south of the Project area;
- Two county roads: Bettas Road, a paved, two lane road near the western edge of the Project area and Hayward Road, an unpaved road toward the south of the Project area;
- Five parcels of land owned by the Washington Department of Natural Resources, located in T 19 N R 17 E, Sections 2, 10, 16 and 22, which are currently leased for grazing;
- A parcel of private land located on either side of the Swauk Creek drainage is currently under a conservation easement with the Nature Conservancy of Washington. Agricultural lands are located south of Highway 10 along the Yakima River. The Project would be located on privately owned land except for the parcels owned by the DNR.

5.1.1.2 Zoning

The property on which the wind turbines would be located contains two zoning designations: Agriculture-20 and Forest and Range. The areas east of Highway 97 are zoned Forest and Range while those west of Highway 97 are zoned Agriculture-20. Exhibit 18, 'Project Area Zoning Designation, Aerial Photo', indicates where these County zoning designations fall within the Project area. The County does not anticipate zoning changes in the Project area.

According to the County's zoning code, the Agriculture-20 agricultural zone is dominated by farming, ranching, and rural lifestyles. The purpose of the zoning classification is to preserve fertile farmland from encroachment by nonagricultural land uses and to protect the rights and traditions of those engaged in agriculture.

The intent of the Forest and Range zone is to provide areas of Kittitas County where natural resource management is the highest priority and where the subdivision and development of lands for uses and activities incompatible with resource management are discouraged.

5.1.2 Environmental Impacts

5.1.2.1 Consistency with Land Use Policies

Land use in Kittitas County is guided by the Kittitas County Comprehensive Plan (Kittitas County, 2001), which implements the planning requirements and goals of the 1990 Washington State Growth Management Act. The Comprehensive Plan is implemented through the adoption of ordinances and codes designed to achieve the objectives and policies outlined in the Plan. It does not contain policies specifically related to wind power projects.

The Plan was reviewed for this land use analysis to assess the Project's consistency with county policies. Only the policies listed below were determined to be potentially relevant to the proposed wind Project. The policy number is provided, followed by the policy itself in quotation marks. The analysis of the Project's consistency is indented below the policy statement.

Chapter 2 Land Use

***"GPO 2.114B.** Economically productive farming should be promoted and protected. Commercial agricultural lands includes those lands that have the high probability of an adequate and dependable water supply, are economically productive, and meet the definition of "Prime Farmland" as defined under 7CFR Chapter VI Part 657.5...."*

The proposed Project would be developed on non-irrigated land, most of which is used for cattle grazing. This land does not meet the definition of Prime Farmland. Removal of minor amounts of rangeland would not affect the productivity of cattle grazing operations. Therefore, the Project would be consistent with this land use policy.

***"GPO 2.118.** Encourage development projects whose outcome will be the significant conservation of farmlands."*

The permanent footprint of the Project will remove approximately 90 acres from open space and cattle grazing uses. This reduction poses a negligible impact to cattle operations. The steady source of income to property owners would increase and diversify overall farm income, creating a beneficial impact and helping to ensure continued agricultural viability. Therefore, development of the Project would not conflict with the above policy.

***"GPO 2.140.** Land use activities within or adjacent to commercial forest land should be sited and designed to minimize conflicts with forest management and other activities on commercial forest lands."*

Although forest cover exists to the north of the Project area, there is no commercial forest land or activities immediately adjacent to the Project and there would be no effects on any forest management or other activities on commercial forest lands.

Chapter 5 Capital Facilities Plan

***"GPO 5.110A.** Capital facilities and utilities may be sited, constructed, and operated by outside public service providers (or sited, constructed, and/or operated jointly with a Master Planned Resort (MRP) or Fully Contained Community to the extent elsewhere permitted), on property located outside of an urban growth area or an urban growth node if such facilities*

and utilities are located within the boundaries of such resort or community which is approved pursuant to County Comprehensive Plan policies and development regulations.”

The Project is located outside any urban growth area or urban growth node, but the policy does not apply to the Project because the policy relates to utility facilities associated with MRPs or Fully Contained Communities, rather than to utility facilities for general public service.

“GPO 5.110B. *Electric and natural gas transmission and distribution facilities may be sited within and through areas of Kittitas County both inside and outside of municipal boundaries, UGAs, UGNs, Master Planned Resorts, and Fully Contained Communities, including to and through rural areas of Kittitas County.”*

To the extent that the underground collector lines associated with the Project are considered electric transmission and/or distribution facilities, this Policy allows their placement in rural areas of the County.

“GPO 5.120. *To recognize the Swiftwater Corridor Vision Plan as a planning tool that provides recommendations for specific strategies to improve, enhance, and sustain the corridor’s unique intrinsic qualities and the many enjoyable experiences it offers. Selected projects within the vision plan shall not place additional management policies or regulations on private property or adjacent landowners beyond those that already exist under federal, state, regional, and local plans and regulations.”*

The Swiftwater Corridor Vision Plan applies to the area along Highway 10 that runs along the southern edge of the Project area. However, as noted in the policy language for GPO 5.120, the Vision Plan does not have regulatory power but instead provides strategies for corridor enhancement. The policy specifically notes that the Vision Plan does not place additional management policies or regulations on private property or adjacent landowners.

Chapter 6 Utilities

“GPO 6.7. *Decisions made by Kittitas County regarding utility facilities will be made in a manner consistent with and complementary to regional demands and resources.”*

The proposed Project would draw upon a county resource (wind) to provide energy to meet the regional power demands. Therefore, development of the Project would be consistent with, and complementary to, regional utility demands and local resources.

“GPO 6.9. *Process permits and approvals for all utility facilities in a fair and timely manner, and in accordance with development regulations that ensure predictability and project concurrency.”*

The proposed Project would be developed in accordance with all local, regional, and state wind power development regulations and would therefore be consistent with this policy.

“GPO 6.10. *Community input should be solicited prior to county approval of utility facilities which may significantly impact the surrounding community.”*

Both the county and the Project developer have solicited community input on the proposed wind farm.

“GPO 6.18. Decisions made regarding utility facilities should be consistent with and complementary to regional demand and resources and should reinforce an interconnected regional distribution network.”

This policy is similar to GPO 6.7. The proposed Project would significantly reinforce an interconnected regional power transmission and distribution network by connecting to Puget Sound Energy’s (PSE) and/or Bonneville Power Administration’s (BPA) electric power grid. Therefore, the Project is consistent with this policy.

“GPO 6.21. Avoid, where possible, routing major electric transmission lines above 55 kV through urban areas.”

The Project does not propose any major electric transmission lines but will connect to existing BPA and/or PSE high voltage transmission lines. The collector cables that connect each wind turbine and strings of turbines will be located underground. In addition, the Project will not be developed in an urban area; therefore, it is consistent with this policy.

“GPO 6.32. Electric and natural gas transmission and distribution facilities may be sited within and through areas of Kittitas County both inside and outside of municipal boundaries, UGAs, UGNs, Master Planned Resorts, and Fully Contained Communities, including to and through rural areas of Kittitas County.”

This policy is identical to Policy GPO 5.11B and has been addressed previously.

Chapter 8 Rural Lands

“GPO 8.7. Private owners should not be expected to provide public benefits without just compensation. If the citizens desire open space, or habitat, or scenic vistas that would require a sacrifice by the landowner or homeowner, all citizens should be prepared to shoulder their share in the sacrifice.”

The proposed wind Project would be constructed on privately owned and DNR land through lease agreements with willing landowners. This comprehensive plan policy suggests that landowners should not be expected to forgo the opportunity to develop wind generation on their properties simply because of potential visual effects, unless the public at large compensates them for their lost opportunity.

“GPO 8.24. Resource activities performed in accordance with county, state and federal laws should not be subject to legal actions as public nuisances.”

The proposed Project, to the extent it is a “resource activity” because it uses the area’s wind resource, would be constructed and operated in accordance with all county, state, and federal laws, and thus is consistent with this policy.

“GPO 8.42. The development of resource based industries and processing should be encouraged.”

Wind energy production is a type of resource-based industry in that it uses a natural renewable resource, the wind. The proposed Project could thus be considered to be consistent with this policy encouraging such industries.

“GPO 8.62. Habitat and scenic areas are public benefits that must be provided and financed by the public at large, not at the expense of individual landowners and homeowners.

This policy is similar to GPO 8.7, and implies that landowners should not be expected to forgo the opportunity to develop wind generation on their properties simply because of potential visual effects, unless they are compensated for their lost opportunity by the public at large.

5.1.2.2 Consistency with Zoning

On August 7, 2001, the Kittitas County Board of County Commissioners (BOCC) unanimously adopted Ordinance 2001-12, an amendment to Chapter 17.61 of the Kittitas County Code allowing Major Alternative Energy Facilities as a conditional use in both the Agriculture-20 and Forest and Range zoning designations. The Kittitas County Board of Adjustment had the authority to authorize a conditional use permit for such a project based upon the following criteria:

- The proposed use is essential or desirable to the public convenience and not detrimental or injurious to the public health, peace, or safety or to the character of the surrounding neighborhood;
- The proposed use will not be unreasonably detrimental to the economic welfare of the County and will not create excessive public cost for facilities and services.

In addition, approval of a conditional use permit by the Board of Adjustment required compliance with review criteria for Special Utilities and Associated Facilities (17.61.030). These criteria require a utility project to:

- Reduce the risk of accidents caused by hazardous materials;
- Use public right-of-ways or established utility corridors when reasonable;
- Consider industry standards, available technology, and proposed design technology for special utilities and associated facilities in promulgating conditions of approval.

This zoning ordinance was in effect throughout the planning phase of the Project. The Applicant coordinated with Kittitas County Planning Department staff and the BOCC to ensure that the proposed Project would comply with the existing zoning criteria in place at the time.

On December 3, 2002, the Kittitas County BOCC changed the zoning ordinance pertaining to wind farm development to shift responsibility for reviewing and permitting wind farms from the Board of Adjustment to the BOCC (Kittitas County Code Chapter 17.61 A , included as Exhibit 15). Wind farms are a permitted use in a Wind Farm Resource Overlay Zoning District. A wind farm may be authorized by the BOCC only through approval of a Wind Farm Resource Development Permit in conjunction with approval of a development agreement.

The development agreement is conditioned upon development standards such as densities, number, size, setbacks, location of turbines and mitigation measures and other appropriate development conditions to protect the surrounding area. The BOCC would concurrently: 1) adopt a site-specific amendment to the Comprehensive Plan land use designation map to Wind Farm Resource Overlay District; 2) adopt a site specific rezone of the county zoning map to Wind Farm Resource Overlay Zoning District; 3) issue a Wind Farm Development Permit; and (4) negotiate

and approve a development agreement. These approvals can be made only if the BOCC determines that 1) the proposal is essential or desirable to the public convenience; 2) the proposal is not detrimental or injurious to the public health, peace, or safety or to the character of the surrounding neighborhood; and 3) the proposed use at the proposed location(s) will not be unreasonably detrimental to the economic welfare of the County and it will not create excessive public cost for facilities and service.

Because the requirements set out in the Kittitas County Code Chapter 17.61A for approval are of the same nature as those used by EFSEC in its administrative and SEPA process, the Project will be built and operated consistent with Kittitas County Code Zoning Code and the Wind Farm Resource Development Overlay Zone criteria.

The Project would be considered desirable to public convenience because it would use a renewable resource to provide clean, safe, quiet, non-polluting energy to help the region meet its energy needs. It would be located on private and DNR property and no public access to the wind turbines would be allowed. It would not be detrimental or injurious to the public health, peace, or safety.

Changes to the surrounding neighborhood would consist of visual changes resulting from the addition of wind turbines to the local landscape. However, the inherent rural character of the surrounding area would not significantly change. Potential visual impacts of the Project are discussed in Section 5.1.4, 'Aesthetics/Light and Glare'.

Development of the Project would generate additional local tax revenues and provide substantial economic benefits to Kittitas County during both construction and operation. Local products and services would be purchased during the construction phase, and hundreds of construction jobs would be created. In addition, lease payments would be made to landowners throughout the life of the Project. The portions of the Project located on DNR property would generate lease revenues that would be applied to local public schools through the state's Common School Fund. The Project would not increase the need for public services such as schools, roads, police and fire service or water and sewer service because no facilities would be developed that require these services (see Section 5.3, 'Public Services and Utilities', below)

The Project would not require the use of hazardous materials; therefore, there are no safety risks associated with hazardous materials. The wind turbine strings and roads would use public right-of-ways and established utility corridors where possible. In some cases, existing farm and private roads would be widened to accommodate construction vehicles. The Project would be constructed and operated in accordance with the latest industry standards and available technology.

Land use impacts associated with construction and operation of the Project would be negligible because the Project would not impair or impact current land uses, change land use patterns, or be incompatible with existing uses or zoning ordinances. Wind farms are generally considered compatible with agricultural and grazing uses. The Agriculture-20 and Forest and Range zoning of the site allows Major Alternative Energy Facilities and Special Utilities as a conditional use. The Project meets the County criteria for a CUP. The Project will not cause impacts or changes to the existing land use in the study area or surrounding area.

5.1.3 Housing

The description of the potential impact on housing needs, costs, or availability due to influx of workers for construction and/or operation of the facility is contained in Section 8.1, 'Socioeconomic Impact'.

5.1.4 Aesthetics and Light and Glare

5.1.4.1 Introduction

5.1.4.1.1 Purpose and Scope

Visual or aesthetic resources are generally defined as the natural and built features of the landscape that can be seen. The combination of landform, water, and vegetation patterns represent the natural landscape features that define an area's visual character while built features such as buildings, roads and other structures reflect human or cultural modifications to the landscape. These natural and built landscape features or visual resources contribute to the public's experience and appreciation of the environment. Visual resource or aesthetic impacts are generally defined in terms of a project's physical characteristics and potential visibility and the extent to which the project's presence would change the perceived visual character and quality of the environment in which it would be located.

In response to EFSEC's requirements for assessment of a proposed project's aesthetic and light and glare impacts, this chapter documents the visual conditions that now exist in the area in which the Kittitas Valley Wind Power Project (Project) is located and evaluates the implications that the Project would have for the public's experience of the area's aesthetic qualities, and day and night light conditions. A number of specialized terms are used in presenting this analysis; definitions of these terms are provided in a Technical Terms section at the end of the chapter.

5.1.4.1.2 Overview of Wind Energy Aesthetic Issues

Wind energy has a long history in that it has been used for centuries for grinding grain and pumping water. As a consequence in many places, including ranches in the American west, windmills have been a long-established and well-accepted part of the landscape. In the United States, large-scale use of wind power to generate electricity first took place in California in the 1980's with establishment of wind farms such as those in the Altamont, Tehachapi, and San Geronimo Passes involving large numbers of small turbines that were closely spaced.¹ Many of these early turbines were supported on lattice steel towers that were similar in appearance to the towers frequently used for transmission lines. These wind farms were located on highly visible sites, in many cases, within close range view of major freeway corridors, and generated considerable discussion about their appearance. Reaction to the wind farms was split. In the view of some, the turbines were visually dominant technological structures that adversely affected the natural or rural character of the landscapes in which they were located. In the view of others, though, the wind turbines were visually interesting technological objects, and the strings of turbines along the ridgelines were seen as delineating and emphasizing the topography's variations. In addition, the movement of the turbines in the wind was seen as introducing an unusual kinesthetic dimension to the visual experience. To some extent, the turbines became a point of visual interest, and were featured in films and advertisements, and were depicted on post cards sold in the regions around the facilities. Although many appreciated the early California wind farms as positive visual features, they

¹ At the Altamont Pass, turbines typically had towers 60 to 80 feet in height and blades 50 to 60 feet in diameter.

created a number of specific aesthetic problems. These problems included creation of dense, disorderly, cluttered-appearing arrays of turbines on hillsides; use of rickety appearing lattice steel towers with awkward designs; use of a variety of highly divergent turbine designs of varying heights in a single installation, creating a sense of visual disunity; the presence of non-operating turbines; visual impacts related to insensitive road cuts; and visible erosion of hillsides related to improper drainage of access roads.² This experience in California provided valuable lessons that have been drawn on in planning and designing subsequent wind energy installations in a way that avoids the aesthetic issues associated with these early projects.

Perception research validates that even though these early California wind farms created specific aesthetic problems, the public perceptions of them, although mixed, were generally favorable. For example, research on public perceptions of the Altamont Wind Energy Area by Thayer and Freeman (1987) found that those surveyed perceived the wind farms in the Altamont Pass area to be highly visible, constructed environments, but that more respondents tended to like wind energy developments than dislike them. However, when asked to rate photos of the wind installations on a scale from beautiful to ugly, respondents rated the views as neutral to slightly ugly. Thayer and Freeman discovered that reactions to the Altamont Wind Energy installations were complex, and factors other than beauty played a major role in determining them. The symbolic or connotative aspects of the wind energy facilities were found to be particularly important in influencing reactions. Those who indicated strongly positive attitudes toward the wind energy facilities were likely to find them to be appropriate, efficient, safe, natural (in the production of energy) progressive, and a sign of the future. Those who indicated strongly negative attitudes tended to cite the visual conspicuousness, clutter, and unattractiveness of the facilities. This finding led Thayer and Freeman to conclude that the two groups focused on different aspects of the facilities "...with the 'like' group responding strongly to the symbolic, referential attributes not automatically associated with the visual stimuli. This group was willing to forgive the visual intrusion of the turbines on the existing landscape for the presumably higher goals of the Project where dislikers were not." (Thayer and Freeman 1987, p. 394)

One of Thayer and Freeman's key findings related to the importance of symbolic aspects in influencing evaluations of wind energy developments is that viewers have negative responses when they see turbines that are not operating. They discovered that viewers expect the turbines to turn when the wind is blowing, and when these expectations are not met, they have negative reactions. Based on their research, Thayer and Freeman reached a number of conclusions related to design measures that could improve the public's perceptions of wind farm attractiveness. Design measures supported by their research include:

- Use of neutral colors for turbines³;
- Evenly spaced arrays;
- Consistency in turbine type and size within arrays;
- Use of fewer, larger turbines versus use of more smaller ones;
- Minimization of conspicuously malfunctioning turbines (Thayer and Freeman 1987, pp. 395-396)⁴.

² For fuller documentation of this experience see Gipe 1995b, 1997.

³ This recommendation is consistent with experience in the electric utility industry, which has found through studies and experience that neutral gray colors perform the best in visually integrating electric transmission lines into the landscape. See for example, Goult (1990) pp 110-120.

⁴ Thayer and Freeman note that in addition to being supported by their own research, these design recommendations are also supported by research by Nassauer and Benner (1984) on landscape preferences that included scenes of oil and gas developments, who found that perceived tidiness was a strong predictor of landscape preference.

The proposed Kittitas Valley Wind Power Project builds on and applies the lessons learned from the California experience. Development of the Project's proposed layout and operational plans were informed by the design principles identified by Thayer and Freeman, and other observers of recent wind energy experience in California and in Europe as well, where the level of concern with landscape values is particularly high.⁵ In addition, the Project will make use of the latest generation of turbines, which are larger, more widely spaced and rotate at lower RPM (revolutions per minute) than those used in earlier projects. The equipment being used reflects design refinements made by industrial designers intended to make the turbine towers, nacelles, and rotors, sleek and attractive elements in the landscape.

5.1.4.1.3 Methodology

This analysis of the visual effects of changes that might occur with implementation of the proposed wind energy facility is based on field observations and review of the following information: research about wind energy facility visual effects, public perceptions of wind energy facilities, and design measures for integrating wind energy facilities into their landscape settings; local planning documents; Project maps, drawings, and technical data; computer-generated maps of the areas from which the Project facilities are potentially visible; aerial and ground level photographs of the Project area; and computer-generated visual simulations. Site reconnaissance was conducted from February 2002 through December 2002 to observe the Project area, to take representative photographs of existing visual conditions and to identify key public views appropriate for simulation.

The visual study employs assessment methods based, in part, on the U.S. Department of the Transportation Federal Highway Administration (FHWA) (US DOT 1988) and other accepted visual analysis techniques as summarized by Smarden et al. (1988). The study is also designed to respond to the provisions of the Washington Code (WAC 463-42-362 Built Environment – Land and Shoreline Use) that specify the analysis of aesthetic and light and glare issues as part of the EFSEC process. Included are systematic documentation of the visual setting, an evaluation of visual changes associated with the Project and measures designed to mitigate the Project's visual effects, including lessening of any light and glare impacts and restoration or enhancement of any portions of the landscape that may have been disturbed during construction.

5.1.4.2 Existing Conditions

5.1.4.2.1 Regional and Local Landscape Setting

The lands on which the Kittitas Valley Wind Power Project is sited extend across a roughly 3.4 by 5.5 mile area of ridge lands located along the northern edge of the Kittitas Valley, approximately 11 miles to the north and west of the City of Ellensburg. These ridge lands slope southward toward the valley from Table Mountain, a 6,359 foot high peak that is part of the Wenatchee Range to the north. The ridges on which the Project is located range in elevation from 2,160 to 3,445 feet above mean sea level, and lie in the area defined by Swauk

⁵ Paul Gipe, a long-time observer of the wind industry in California and an advocate for wind energy development that respects community landscape values has developed further lists of aesthetics guidelines for wind plants based on the lessons learned in California and elsewhere that are consistent with and expand upon those identified by Thayer and Freeman (Gipe 1995a, 1995b, 2002). For reflections on experience in integrating wind energy facilities into the landscape in the US and Europe, see Pasqualetti, Gipe, and Righer 2002.

Creek on the west and Green Canyon on the east. The tops of the ridges have a gentle southward slope, and the ridge area is dissected by a number of deep, narrow, steep-sided canyons.

The Project area has an open, windswept appearance. Most of the ridgetops on which the Project facilities would be located consist of dry, rocky grasslands used for grazing. To a large degree, trees and shrubs are limited to the areas along the streams in the canyons. The exception is in the higher elevation areas at the Project's northern fringes, where there are clusters of ponderosa pines and other conifers that form the southern edge of the forests that lie upslope to the north.

The Project area is roughly bisected by Highway 97, a north-south route of regional importance. The most visually prominent built features in the Project area in addition to Highway 97 are the sets of large electric transmission lines in the Bonneville Power Administration (BPA) and Puget Sound Energy (PSE) transmission corridors that cross the Project area in an east-west direction. Although many portions of the Project area are uninhabited, there are clusters of rural residences on large parcels in several areas, most notably along the Highway 97 corridor just south of the Project site, in portions of the ridge area east of Highway 97, and along Bettas Road. Under the Kittitas County Comprehensive Plan (Kittitas County, 2001) and Zoning Ordinance, the lands in the Project area have been designated as Agriculture-20 and Forest and Range land use areas. The Comprehensive Plan does not acknowledge any special scenic or visual resource values in the Project area, and does not include policies that are specifically oriented to protection of Project area scenic qualities.

Although the County's Comprehensive Plan is silent on the question of scenic values in the Project area and vicinity, the corridor along Highway 10, which runs along the southern edge of the Project area, has gained some recognition as having scenic values⁶. In the 1990's, Kittitas County received a grant from the Quad County Regional Transportation Organization that enabled it to prepare a plan for a scenic route that would include this segment of Highway 10, along with segments of Highways 970 and 903, which follow the segments of the Yakima and the Cle Elum Rivers between Ellensburg and Salmon La Sac. To prepare this plan, the County established a Corridor Planning Management Team (CPMT) that included citizens, agency representatives, and technical experts, including county staff and representatives from the Washington State Department of Transportation and the Forest Service. Under the CPMT's direction, a planning report for this corridor, titled *The Swift Water Corridor Vision* (Kittitas County, 1997) was prepared. This report documents the corridor's scenic values and identifies opportunities for undertaking road improvement measures and development of roadway amenities and interpretive installations. As the vision statement takes pains to point out, "This Vision is **not** intended to be a plan that creates additional management policies, regulations, or restriction on private property, beyond those that already exist under federal, state, regional, and local plans and regulations. ***This Vision is not a mandate; it is a recommendation.***" Although the Swiftwater Vision was completed and published in 1997, it has not been formally adopted by the County.

5.1.4.2.2 Project Site Visibility

⁶ For example, the American Automobile Association map of Washington indicates that the segment of Highway 10 between Cle Elum and Ellensburg is an "AAA Designated Scenic Byway" and local tourist literature promotes Route 10 as a scenic alternative to I-90.

Exhibits 22-1 and 22-2, Potential Project Visual Impact in the Region and Potential Local Project Visual Impact, provide a generalized indication of the areas from which the proposed wind turbines will be potentially visible. These visibility analyses were prepared using the “Zones of Visual Influence” (ZVI) feature of the WindPro software system, a sophisticated program developed to assist in the planning, design, and environmental assessment of wind energy projects (EMD 2002). To identify the areas from which the turbines are potentially visible, the ZVI module makes use of a digital height model generated from digital height contour lines. The module calculates lines of sight between each point on the land surface and the tops of each of the proposed turbines, and notes whether there is an unobstructed view toward the turbine. When the analysis is complete, the module produces maps showing the areas from which the turbines will be potentially visible, and can create the maps in a way that indicates the numbers of turbines that are potentially visible from each point in the surrounding landscape.

The visibility data presented in Exhibits 22-1 and 22-2 represent the potential visibility of the turbine towers, which will extend up to 262 feet above the surface of the ground, and the rotor blades, which will extend up to 410 feet above the ground surface. Both figures were prepared using the 20 foot contour lines from the USGS topographic maps available for the region. Both figures represent “worst case” assessments of potential Project visibility because they do not take into account the effect that other structures close to viewer might have on obstructing views toward the turbines. The visibility analyses presented on these figures do not reflect any screening effects that might be provided by trees, and thus overstate the potential visibility of the turbines to some degree. The overstatement of the potential visibility is particularly pronounced in and around Section 35 in the area to the north of the turbines located on the ridge lands east of Highway 97 where in reality, the presence of thick tree cover will provides substantial screening of views from the cluster of lots located on the slope above the Project area.

Exhibit 22-1 provides an understanding of the Project’s potential visibility in the Project area’s larger landscape context, including areas that are as far as 12 miles away from the Project site. This exhibit indicates the areas from which any turbines at all would be potentially visible.

Exhibit 22-2 is a more detailed map that focuses in on the Project area’s foreground and middle ground viewing areas (the areas up to 5 miles). These viewing areas derive from the landscape visual analysis systems developed by the US Forest Service and other agencies, which divide the landscape up into distance zones that are related to the degree to which landscape details are detectable to the viewer. The foreground distance zone is defined as the area within $\frac{1}{4}$ to $\frac{1}{2}$ mile from the viewer, where the maximum discernment of detail is possible. The middle ground is defined as the area from $\frac{1}{4}$ to 3 to 5 miles from the viewer, where there is visual simplification of vegetative surfaces into textures, overall shapes and patterns, and there is linkage between foreground and background parts of the landscape. The background is defined as the landscape zone 3 to 5 miles and further from the viewer in which little color or texture is apparent, colors blur into values of blue or gray, and individual visual impacts become least apparent (USDA Forest Service 1973, pp. 56-57). The graphic display on this map provides an indication of the relative numbers of turbines that can be seen from each location in the surrounding landscape. Both Exhibits 22-1 and 22-2 are annotated with numbers and arrows that indicate the locations from which the character photos, presented as Exhibit 22-3, Figures 3a through 3i, and the simulation views, presented as Exhibit 22-3, Figures 4 through 19, were taken.

Review of Exhibit 22-1 suggests that one or more turbines will be visible to one degree or another from most of the valley and foothill areas to the north and west of Ellensburg. The one notable exception is in the corridor along Highway 10 to the northwest of Ellensburg, where there are pockets where views toward the turbines will be blocked by the ridge defining the river canyon road corridor's northeastern edge. Based on field work conducted in the area, it is fair to say that the seen area analysis presented on Exhibit 22-1 substantially overstates the Project's potential visibility in that there are many areas, particularly in the City of Ellensburg and in the corridors along I-90 and the Yakima River where structures and trees in the foreground of the view create substantial or complete blockage of views toward the distant foothill region where the Project will be located.

Review of Exhibit 22-2 indicates that the greatest numbers of turbines will be visible from the wide, flat valley area north of Ellensburg and east of Highway 97, from the tops of the ridges in the foothill areas, and from Thorp Prairie. From most areas of the narrow, steep sided valleys that lie within and close to the Project area, relatively small numbers of turbines will be visible from any given location.

5.1.4.2.3 Viewing Areas

To structure the analysis of the Project's effects on visual resources, the Project area was divided up into a number of viewing areas – areas which offer similar kinds of views toward the Project site and/or within which there would likely be similar concerns about landscape issues. The existing visual conditions of views from these areas toward the Project site are described below. Within most of these viewing areas, Simulation Viewpoints (SVs) were selected as locations for taking photos that could be used for the development of simulated views of the Project that could form the basis for visualizing the Project's potential visual effects. The simulation viewpoints were established to capture views that are typical of the conditions that exist in each of the viewing areas. The emphasis was placed on views from publicly accessible locations that would be likely to be seen by the largest numbers of people.

5.1.4.2.4 Assessment of Scenic Quality

To assess the scenic quality of the landscapes potentially affected by the proposed alternatives, the analyses of the views toward the Project site from each of the viewing areas includes an overall rating of the level of scenic quality prevailing in the views. These ratings were developed based on field observations made in November 2002, review of photos of the affected area, review of methods for assessment of visual quality, and review of research on public perceptions of the environment and scenic beauty ratings of landscape scenes. The final assessment of scenic quality was made based on professional judgment that took a broad spectrum of factors into consideration, including:

- Natural features, including topography, water courses, rock outcrops, and natural vegetation;
- The positive and negative effects of man-made alterations and built structures on visual quality; and
- Visual composition, including an assessment of the vividness, intactness, and unity of patterns in the landscape.⁷

⁷ For definitions of these terms, please refer to the Technical Terms section at the end of this chapter.

The final ratings assigned to each view fit within the rating scale summarized in Table 5.1.4-1. Development of this scale builds on a scale developed for use with an artificial intelligence system for evaluation of landscape visual quality (Buhyoff et al., 1994), and incorporates landscape assessment concepts applied by the U.S. Forest Service and the U.S. Department of Transportation.

Table 5.1.4-1. Landscape Scenic Quality Scale

Rating	Explanation
Outstanding Visual Quality	A rating reserved for landscapes with exceptionally high visual quality. These landscapes are significant nationally or regionally. They usually contain exceptional natural or cultural features that contribute to this rating. They are what we think of as “picture post card” landscapes. People are attracted to these landscapes to view them.
High Visual Quality	Landscapes that have high quality scenic value. This may be due to cultural or natural features contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These landscapes have high levels of vividness, unity, and intactness.
Moderately High Visual Quality	Landscapes that have above average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to man-made or natural features contained within the landscape, to the arrangement of spaces, in the landscape or to the two-dimensional attributes of the landscape. Levels of vividness, unity, and intactness are moderate to high.
Moderate Visual Quality	Landscapes, that are common or typical landscapes that have, average scenic value. They usually lack significant man-made or natural features. Their scenic value is primarily a result of the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are average.
Moderately Low Visual Quality	Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant man-made alterations, but these features do not dominate the landscape. They often lack spaces that people will perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.
Low Visual Quality	Landscapes that have below average scenic value. They may contain visually discordant man-made alterations, and often provide little interest in terms of two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are below average.

Note: Rating scale based on Buhyoff et al., 1994; U.S. DOT Federal Highway Administration, 1988, and United States Department of Agriculture Forest Service. 1995.

5.1.4.2.6 Assessment of Visual Sensitivity

The analysis of viewers, viewing conditions, and viewer sensitivity in each viewing area was structured to consider residential viewers, roadway viewers, and, to the extent to which they are present, recreational viewers. To summarize the insights developed through the analysis of viewer sensitivity, overall levels of visual sensitivity along the various sections of the alternative routes were identified as being High, Moderate, or Low. In general, High levels of sensitivity were assigned in situations where turbines would be potentially visible within 0.5 mile or less from residential properties, heavily traveled roadways, or heavily used recreational facilities. Moderate levels of sensitivity were assigned to areas where turbines would be potentially visible within 0.5 to 5 miles within the primary view cone of residences and roadways. In distinguishing between moderate and low levels of sensitivity in the 0.5 to 5

mile zone, account was also taken of contextual factors, including the viewing conditions in the immediate foreground of the view. In areas lying 5 miles or more from the closest turbine, where a wind farm would be distant and relatively minor element in the overall landscape, a low level of sensitivity was assigned.

5.1.4.3 Existing Visual Conditions in the Landscape Viewing Areas

5.1.4.3.1 Highway 97 Corridor

Landscape Description and Scenic Quality:

The Project area is roughly bisected by Highway 97, an old US highway that begins in California, and extends along the eastern edge of the Cascades through Oregon and Washington. Locally, Highway 97 plays an important role as a route between Ellensburg and Wenatchee. As indicated in Table 5.2.1-1 in the 'Traffic and Transportation' section, in 2001 the Average Daily Traffic on the segment of Highway 97 between Ellensburg and Highway 970 was 2,800 vehicles.

As it heads north from Ellensburg, Highway 97 travels along the wash along Dry Creek as it passes through the generally flat and open upper reaches of the Kittitas Valley. Along the stretch of highway approaching the Project area from the south, northbound travelers are able to see the grass and shrub-steppe covered lower slopes of the ridge spurs that define the Valley's northern edge, as well as the forest covered upper ridge areas (Exhibit 22-3, Photo 1 on Figure 3a). As travelers approach within a mile or closer to the Project area, the lower slopes of the ridge spurs become more prominent in the view, and block the views toward the forested upper slopes. In this area, the landscape consists of open shrub-steppe lands with a scattering of rural residences that are generally highly visible because of the openness of the surrounding landscape. The most visually prominent built features in this area are the lattice steel transmission towers on the Bonneville Power Administration (BPA) transmission corridor that crosses Highway 97 and the adjoining ridge lands along the southern edge of the Project area (Exhibit 22-3, Photo 2 on Figure 3a and Simulation View 1 on Figure 4a). The BPA transmission corridor accommodates 4 sets of high voltage transmission towers of varying design (Exhibit 22-3, Photo 4 on Figure 3b) that extend up to 182 feet in height. Along the segment of Highway 97 that extends from a point several miles south of the Project area to the place where the Project area begins at the BPA transmission corridor, the level of existing visual quality can be generally be classified as moderately low.

As Highway 97 enters the Project area, the corridor along Dry Creek that it follows becomes a well-defined valley through the ridge lands (Exhibit 22-3, Photo 3 on Figure 3b). The highway passes through this valley (Exhibit 22-3, Photo 5 on Figure 3b and Photo 6 on Figure 3c) and up a long, steep slope to a crest at approximately 1,700 feet in elevation where it passes over the side of one of the ridges. The most prominent landmark at the crest area is a privately owned gravel pit and gravel storage area located along the west side of the road. In this area, views for northbound travelers toward the ridge lands to the east where many of the Project turbines will be located are constrained to some degree by the steep-sided road cuts along the east side of the road. Views toward the ridgeline to the west where String F is proposed are more open. The area along the west side of the highway at Bettas Road, where the proposed operations and maintenance (O&M) facility and Project substation would be located, is also in open view from the highway (Exhibit 22-3, Photo 6 on Figure 3C). Although the landscape in this area consists primarily of open shrub-steppe lands, there are

clusters of ponderosa pines and other trees at scattered locations along the edge of Dry Creek (Exhibit 22-3, Photo 5 on Figure 3b and Photo 6 on Figure 3c). This area is crossed by a single PSE 230-kV line that is carried on wood pole H-frame towers (Exhibit 22-3 Photo 6 on Figure 3c). The level of existing visual quality in the area along Highway 97 extending from the BPA transmission corridor to the road's crest on the side of the ridge ranges from moderately low to moderate.

From the gravel pit area at the crest, Highway 97 travels northward down a long slope, and in the area close to Highway 970, enters Hidden Valley a small valley formed by Swauk Creek, and continues to the intersection with Highway 970. The area along this segment of the highway is a transition zone between the open, grass and shrub-steppe covered ridges to the south and the more heavily forested mountain and valley areas to the north. In this area, like the area to the south, views for northbound travelers toward the ridge lands to the east where many of the turbines will be located are constrained to a large degree by the steep road cuts along the road's eastern edge. In this area, the road cuts include scattered clusters of trees at various stages of maturity (Exhibit 22-3, Photo 7 on Figure 3c). The BPA Rocky Reach – Maple Valley 230-kV transmission line, which is carried on tall lattice steel transmission towers, crosses this segment of the highway. One of this line's towers is visible in the mid-distance in the hillside area seen in Simulation View on Exhibit 22-3, Figure 5a. In the area between the gravel pit at the crest and the transmission line crossing, the level of visual quality is moderate. A half mile north of the transmission line crossing, where the highway enters Hidden Valley and a more rugged, forested, and visually intact landscape comes into view, the level of visual quality is moderately high to high (Exhibit 22-3, Photo 8 on Figure 3C).

Traveling south toward the Project area from the intersection with Highway 970, Highway 97 first passes through the meadows and forests of Hidden Valley, and as the road starts to travel up the ridge, the view opens up to reveal the ridge along the east side of the highway where String G is proposed (Exhibit 22-3, Photo 9 on Figure 3d). Further up the road, in the vicinity of the intersection with the northern end of Bettas Road, this ridge becomes the primary element in the cone of vision of roadway viewers (Exhibit 22-3, Simulation View 3 on Figure 6a). South of the intersection with Bettas Road, as the roadway travels along the base of the steep slopes of the ridge, the view to the east and to the ridge top becomes more constrained, but the view toward the southwest and the ridge top on which String F will be located opens up (Exhibit 22-3, Photo 10 on Figure 3d). Along this segment of the highway, the most salient developed features in the southbound view are the road and road cuts, the BPA Rocky Reach-Maple Valley transmission line (Exhibit 22-3, Photo 9 on Figure 3d), and the gravel piles at the gravel facility at the top of the ridge (Exhibit 22-3, Photo 10 on Figure 3d). Along this segment of Highway 97, the visual quality of southbound views ranges from moderately high in Hidden Valley to moderate in the area further to the south.

After Highway 97 crosses over the crest by the gravel facility, views for southbound travelers open up to reveal a panorama to the southwest and then to the south across the ridge lands and the Kittitas Valley toward Manastash Ridge and other high ridges 20 miles or more in the distance. In this area, views toward the ridge lands to the east where many of the turbines will be located are constrained to some degree by the road cuts, but views toward the ridge top to the west where String F is planned are more open, although they are screened in places by clusters of trees along the highway's edge (Exhibit 22-3, Photo 11 on Figure 3d). Further south along Highway 97, the ridge lands on which turbines would be located move out of the southbound traveler's cone of vision, but the Project's substation and O&M facility sites become prominently visible in the canyon area at the base of the slope. In this area, the

landscape consists primarily of open shrub-steppe land, and the transmission towers in the PSE and BPA transmission corridors become prominent elements of the landscape pattern. Along this segment of Highway 97, southbound views from the highway range from moderate to moderately high on the upper slopes to moderately low in the areas on the lower slopes where the many transmission lines are an important element of the view.

South of the BPA transmission lines at the southern end of the Project area, there is a scattering of rural residential development in the corridor alongside the highway. Some of this development lies along Sagebrush Road and Ellensburg Ranches Road, private roads that serve a large-lot subdivision developed on the ridge slopes to the west of the highway. In this area, there are over 30 lots, of which about half have been developed with residences. All of these residences are located 0.7 mile or more from the closest turbines proposed for the ridge lands across Highway 97 to the east. Several of the residences at the northern end of Sagebrush Road lie within 0.5 mile of the southernmost turbine proposed as a part of String E, which will be located on the ridge top to the northwest. Simulation View 4 on Figure 7a, Exhibit 22-3, is a view looking north along Sagebrush Road toward the ridge lands east of Highway 97 on which development of Strings G, H, I and J is proposed. Several additional rural residences on large lots lie along the east side of Highway 97 in the area along Nacho Lane. These residences all lie more than 0.5 mile from the closest turbine. Some of these residences are visible in Exhibit 22-3, Photo 1 on Figure 3a. In general, views toward the Project site from residences in the area along both sides of the Highway 97 corridor in this area have visual quality levels that range from moderately low to moderate.

Viewers and Visual Sensitivity:

The traffic volume on Highway 97 is 2,800 vehicles per day, a figure that, according to WDOT information, includes about 500 trucks. For the entire length of Highway 97 extending from the intersection with northern end of Nacho Road to a point slightly north of the intersection with the northern end of Bettas Road, the highway lies within 0.5 mile of the closest proposed wind turbine. In this area within 0.5 mile from the proposed turbine locations, the sensitivity of viewers is assumed to be high. Along the portions of the highway to the north and south of this road segment where travelers are in the zone between 0.5 and 2 miles from the closest turbine, the level of traveler sensitivity is considered to be moderate. For the most part, the sensitivity of the views from the rural residences located in the Highway 97 corridor in the area south of the BPA transmission corridor can be considered to be moderate because most of these residences are located 0.5 mile or more from the closest proposed turbine. The exception is that there are several residences located at the northern end of Sagebrush Road that lie less than 0.5 mile from proposed turbines E4 and E5, and because of their proximity to these proposed turbines, the level of visual sensitivity is being rated as high. However, an additional factor that needs to be considered is that some of these residences are located downslope from these turbine sites, and that none of these residences are oriented toward these turbine locations.

5.1.4.3.2 Ridge Lands East of Highway 97

Landscape Description and Scenic Quality:

This viewing area encompasses the terrain east of Highway 97 that consists of long, north-south trending ridges separated by narrow canyons. In this area, 71 of the Project's turbines will be located along the ridgelines in Strings G, H, I, and J. Most of this area is open in

character and covered in grass and shrub-steppe vegetation, although there is some riparian vegetation along the creeks in the canyons, and the slopes at the northern end of the ridges are covered with forests of Ponderosa pine and other evergreen trees. The most visually prominent developed features in this area are the transmission structures in the BPA transmission corridor that runs across the southern ends of the ridges (visible in Photo 12 on Figure 3e, Exhibit 22-3) and the PSE and BPA transmission lines that run through the area at points further up the ridges. For the most part, the lands in this area are used for grazing, but the area also contains a number of scattered rural residences. Some of these residences are accessed by Cricklewood Lane, a private road that extends into the canyon area between the ridges on which Strings I and J will be located. Although Cricklewood Lane is a private road, it is un-gated in the area from Highway 97 to the BPA transmission line corridor. North of this area, access is restricted by a locked gate. Photo 12 on Figure 3e, Exhibit 22-3, is a view toward the Project site from the lower portion of this road. A total of approximately 35 residences and recreational properties are accessed by way of Elk Springs Road, a private road that extends along the top of the ridge on which String I will be developed. Elk Springs Road is gated at Highway 97, and is accessible only to property owners with a key. Several residences are located at widely dispersed locations along the ridge, but the largest single concentration is in Township 20 North, Range 17 East, Section 35, which is located on the forested slopes that lie to the north of proposed Strings G and H. Photo 14 on Figure 3f, Exhibit 22-3, is a view toward Section 35 from the upper end of Elk Springs Road; Section 35 encompasses the sloped and forested area visible on the right half of the photo, as well as a portion of the flat, open area at the base of the slope. This section has been divided into 32 lots ranging from 10 to 60 acres in size. Approximately 20 of these parcels have some kind of structure or a trailer on them. Conversations with residents of Elk Springs Road suggest that approximately 5 of the parcels in Section 35 have residences that are occupied on a full-time basis; 6 of the parcels are used on weekends, that 9 are used occasionally (more than a few times a year, but less frequently than most weekends); and that the rest are used infrequently (a few times a year). Simulation View 5 (Figure 8a, Exhibit 22-3) is a view from one of the residences in Section 35, looking south toward the area in which Strings F, G, H, I, and J are planned. The visual quality of the views in this area range from moderately low in the area at the base of the ridges (Photo 12, Exhibit 22-3), moderate, along the ridgetops (Photo 13, Exhibit 22-3), and in locations in Section 35 from which panoramic views toward the south are available, moderately high to high (Figure 8a, Exhibit 22-3).

Visual Sensitivity:

Because portions of Cricklewood Lane and most of Elk Springs Road are located in areas with open views that lie within 0.5 mile or less of proposed turbines, the views from these roads can be considered to be sensitive. Because these are private, dead-end roads whose primary function is to provide access to abutting properties, the numbers of road users affected can be assumed to be relatively small. In light of the restricted access to these road segments and the small numbers of viewers, the level of sensitivity to Project visual effects is classified as low.

For the total of 11 residences located along Cricklewood Lane and the lower and middle sections of Elk Springs Road that lie within 0.5 mile of the proposed turbines and which would have unobstructed views of them, the sensitivity of views is high. Field studies, aerial reconnaissance, and review of maps and photos indicate that in Section 35, there is heavy tree cover that provides partial to full screening of many of the views toward the area where the turbines would be located. Given this tree screening, it appears that there are 5 existing residences from which the proposed turbines would be potentially visible. Three of these

residences lie within 0.5 mile of the proposed turbines, and views from these residences would be considered to have a high level of sensitivity. Because the other two residences in Section 35 from which the turbines would be potentially visible lie more than 0.5 miles from the location of the closest proposed turbine, the visual sensitivity of views from those properties is considered to be moderate.

5.1.4.3.3 Bettas Road

Landscape Description and Scenic Quality:

This viewing area consists of the corridor along Bettas Road that extends westward from the area west of the site of the proposed O&M facility and substations, and then north to the point where the northern end of Bettas Road intersects with Highway 97. The southeastern portion of this corridor lies in a draw that drains into Dry Creek to the east. This area has a shrub-steppe landscape, and except for the road itself and a PSE 230 kV transmission line carried on wood pole, H-frame towers that pass through it, this portion of the Bettas Road corridor is undeveloped. After passing over the crest of the ridge, Bettas Road descends into Horse Canyon, a small valley with a rural character. At the southern end of the valley, there is a cluster of five rural residences on ranchette parcels. Further north along the road, there are two dwellings associated with larger ranch properties. Photo 15 on Figure 3f, Exhibit 22-3, is a panoramic view from Bettas Road at the intersection with Hayward Road, at the top of the ridge that separates the Dry Creek drainage to the east from Horse Canyon to the west and north. The southernmost of the cluster of rural residences along the west side of Bettas road is visible at the left side of the photos. Just to the right of this house, the slopes defining the western side of Horse Canyon are visible. The ridge area visible on the right side of the photo is the location where String F is proposed. The tilt to the trees visible in this portion of the view reflects the high wind levels that prevail in this area. Photo 16 on Figure 3g, Exhibit 22-3, is a view looking north along Bettas Road from within Horse Canyon. One of the ranch residences is visible in the mid-distance on the left side of the road. Simulation View 6 (Figure 9a, Exhibit 22-3) is a view toward the north from the northern portion of Bettas Road. The BPA Rocky Reach-Maple Valley transmission line is visible crossing the ridge in the mid-distance. String G is proposed for development on the ridgeline on which the transmission towers are now visible. In the middle ground of the view, Highway 97 can be seen traveling up the slope at the base of this ridge. Along the portion of the Bettas Road corridor south and east of the ridgeline separating the two drainages, the level of existing visual quality is moderately low. North and west of the ridgeline the level of visual quality is moderately high, reflecting more vivid topographic and vegetative conditions, and moderately high levels of unity and intactness.

Visual Sensitivity:

The level of sensitivity of views on Bettas Road is moderate. Although from most portions of the road, turbines will be visible within 0.5 miles, the numbers of travelers affected is very low. As indicated in Table 5.2.1-1 in the 'Traffic and Transportation' section, in 2001 the Average Daily Traffic (ADT) on Bettas Road was only 26 vehicles per day. It should also be noted that from the portions of the road at the base of steep slopes, the slopes will constrain views toward the closest turbines. All of the residences along the Bettas Road corridor are within 0.5 mile, or are close to 0.5 mile from the closest proposed turbine location. From most of the residences, the level of visual sensitivity is high, but from several which are oriented toward views down the valley to the southwest, rather than to views toward the ridgelines to the east and north, the level of sensitivity is moderate.

5.1.4.3.4 Highway 970/Hidden Valley

Landscape Description and Scenic Quality:

This viewing area encompasses the corridor along Highway 970 and Hidden Valley, areas that lie a mile or more to the west and north of the Project site. Highway 970 is a state highway that connects Cle Elum to Highway 97 and Wenatchee, and has an ADT of 5,100 vehicles per day. Hidden Valley is a valley formed by Swauk Creek that extends toward the southwest from the intersection of Highways 970 and 97. The Valley has a rural character and contains a mix of ranches and rural residences on ranchette parcels. Photo 17 on Figure 3g, Exhibit 22-3, is a panoramic view taken from a viewpoint on Hidden Valley Road near Highway 970 at a point a little less than 3 miles from the Project area. The ridgeline on which String G is proposed is visible as the un-forested ridge that can be seen in the distance in the middle of the right side of the view. The BPA Rocky Reach-Maple Valley transmission line can be seen crossing the meadow in the far foreground of this view. Simulation View 7 on Figure 10a, Exhibit 22-3, is a single frame view from a viewpoint just south of the location from which Photo 17 was taken. This view focuses specifically on the ridgeline on which the development of String G is proposed. One of the transmission structures that is a part of the Rocky Reach –Maple Valley transmission line is detectable on the ridgeline in the area slightly to the right of the view's center. In general, views toward the Project site from the Highway 970/Hidden Valley area have moderately high levels of visual quality, reflecting moderately high levels of vividness, unity, and intactness.

Visual Sensitivity:

Although Highway 970 carries relatively high levels of traffic, because the areas from which the Project might potentially be seen from the highway lie 1.5 mile or more from the closest proposed turbine and generally do not lie within the primary cone of vision of highway travelers, the level of sensitivity of views from this roadway to Project-related visual changes is low. In this viewing area, the closest residences to the Project site are those located along the eastern end of Hidden Valley Road, at a distance of approximately 1.5 miles to the northwest of the closest turbine. Other residences lie further to the west at distances of 2 miles or more from the Project site. Because the ridgeline on which the closest turbines will be located lies in the middle ground viewing zone, the sensitivity of views from these residences to Project effects is considered to be moderate.

5.1.4.3.5 Hayward Hill

Landscape Description and Scenic Quality:

Hayward Hill is the 2300 to 2400 foot elevation ridge that lies along the northeastern edge of the Yakima River in the area approximately 2 miles northwest of the community of Thorp. This ridge, which extends for about 2.5 miles, is proposed as the site of Strings A and B. This windswept ridge has a grassland and shrub steppe landscape, and as a consequence has a very open appearance. The ridge is crossed by Hayward Road, a narrow, unpaved county-maintained road that extends approximately 2.7 miles from the intersection of Highway 10 and Thorp Road on the south to Bettas Road on the north. Except for the road and the BPA and PSE transmission lines that cross the ridge at its north end near its intersection with Bettas Road, Hayward Hill is essentially undeveloped. A large parcel on the southwest side of the ridge is owned by the Cascade Field & Stream Club, and is proposed for use as a

recreational firing range, although a permit for such use has not yet been approved. Photo 18 on Figure 3h, Exhibit 22-3 is a view from the northern end of Hayward Road looking north toward the BPA transmission line. Photo 19 is a view from the same general area looking south across the top of the ridge and across the upper Kittitas Valley toward the distant ridges to the south. In general, the existing level of visual quality of views on Hayward Hill is moderate, reflecting generally lower than average levels of vividness and mixed but not particularly high levels of unity and intactness.

Visual Sensitivity:

The sensitivity of views on Hayward Hill is low. As indicated in Table 5.2.1-1 in the 'Traffic and Transportation' section, average daily traffic on Hayward Road is estimated to be 26 vehicles per day. Although Hayward Road passes in close proximity to and well within 0.5 mile from the proposed turbines, given the low numbers of travelers, the views of users of this road are considered to have a low level of sensitivity. Because there are no residences on Hayward Hill that are located within 0.5 mile of proposed turbines, there are no residences in this area that are considered to have a high or moderate level of sensitivity to the visual changes that the Project might create.

5.1.4.3.6 Highway 10 Corridor

Landscape Description and Scenic Quality:

This viewing area extends along an approximately 6 mile long segment of Highway 10, a state highway that travels along the northern banks of the Yakima River and which provides both nearby and more distant views of portions of the Project areas. Highway 10 was formerly a major east-west route across the state, but since the opening of Interstate 90, now plays the role of an alternative route between Ellensburg and Cle Elum. The section of Highway 10 between Ellensburg and Cle Elum is also recognized as having scenic qualities, and to some degree is promoted as a scenic byway. As indicated in this section's Regional and Local Landscape Setting discussion, this section of Highway 10 is designated on the American Automobile Association's State of Washington map as a scenic route, and a planning report, the Swift Water Corridor Vision (Kittitas County, 1997), has been prepared that identifies measures to develop roadway improvements and roadside amenities that will enhance the road's scenic qualities. As indicated on Table 5.2.1-1, the Average Daily Traffic on Highway 10 is 1,200 vehicles per day. The area along the corridor is only lightly developed. Except for scattered ranch dwellings and clusters of rural residences the landscape along the southeastern and central portions of this highway segment consists of open grasslands and areas of riparian forest. A distinctive landscape element in this area is an old flume structure that skirts the base of the bluffs just to the east of the road. Photo 20 on Figure 3i, Exhibit 22-3, is a view from Highway 10 in this area looking northwest toward Hayward Hill, where String B is proposed. Simulation View 8 on Figure 11a, Exhibit 22-3, is a view looking west along the Highway at the intersection of Hayward Road and taking in the ridge tops where String A and a portion of String B would be located. Photo 21 on Figure 3i, Exhibit 22-3, is a view looking east toward Hayward Hill from Thorp Road at Highway 10. Along this segment of Highway 10, the visual quality of views toward the Project site is generally moderate to moderately high. Further to the northwest, where the highway alignment is located at a higher elevation along the side of the bluff defining the river canyon, there is no development, and the landscape is characterized by rock outcrops, clusters of trees and shrubs, and views of the canyon below and the rail corridors that follow it. Photos 22 and 23 on Figure 3i and Simulation view 9 on Figure 12a, Exhibit 22-3, represent views to the

east from Highway 10 in this area, looking toward the ridgeline of Hayward Hill where String B is proposed. Along this segment of the highway corridor, the visual quality of views toward the Project site also ranges from moderate to moderately high.

Visual Sensitivity:

Because several short segments of Highway 10 lie within 0.5 mile of the closest proposed turbine, because the highway carries a moderately high level of traffic, because the road has been recognized as having scenic qualities, and because efforts have been started to enhance the highway's role as a scenic corridor, the sensitivity of views from the highway toward the Project is high.

Although ridgelines where turbines are proposed are potentially visible from the small number of residences scattered along this corridor, the level of visual sensitivity of views from these properties is moderate at most, because these residences are not generally located within the foreground viewing zone, and in most cases, the residences are not oriented toward views of the ridge tops.

The segment of the Yakima River that Highway 10 follows in this area receives a low to moderate level of recreational use, primarily for fishing. Recreational use of this segment of the river is limited by the fact that there are no public river access facilities in this area. Along the western portion of this corridor, a segment of the John Wayne Trail makes use of an abandoned railroad right-of-way along the south side of the River. This trail is described in more detail in the discussion below. Because of the relatively low numbers of recreational users in this area, because most areas of the River and Trail are located a mile or more from the closest proposed turbine and because in many places views toward the Project site are constrained by the steep sides of the bluffs and by stands of riparian vegetation, the sensitivity of views toward the Project site from the recreational use areas is low to moderate.

5.1.4.3.7 John Wayne Trail

Landscape Description and Scenic Quality:

This viewing area encompasses the segment of the John Wayne Trail that lies within 5 miles of the Project site. The John Wayne Trail is a hiking, biking, and equestrian trail that has been developed in the Iron Horse State Park, a state park created on the former right of way of the Milwaukee Road railroad, which was acquired by Washington State Parks in the 1980s. The John Wayne Trail extends 109 miles from a trailhead near North Bend to the west to the Columbia River on the east. In the Project area, the Trail has a wide gravel surface, and is paralleled by a PSE electric transmission line and distribution line carried on wood poles. The only formal trailhead in this area is on Thorp Depot Road south of the community of Thorp. From most areas of the trail, the ridges on which the Project would be developed are visible at a distance ranging from one to five miles. Simulation View 11 on Figure 14a, Exhibit 22-3, is a representative view from the trail toward the Project area. This photo was taken along the trail at a point just north of Taneum Road in the area north of Thorp. At this point, the closest turbine would be located approximately two miles from the Trail. From most areas along the Trail, the visual quality of views toward the Project site would be rated as moderately high. The ridgelines in the middle ground and the higher elevation slopes visible in some places in the background provide a moderately high level of vividness. The level of visual unity and intactness is decreased to some degree by the presence of the transmission and distribution lines in the immediate foreground of the view.

Visual Sensitivity:

Washington State Parks reports that in 2001, the portion of the John Wayne Trail extending from North Bend to Thorp had 163,532 visitors, that the segment from Thorp eastward to Vantage had 21,079 visitors, and that most visits took place during the summer season. It is likely that use levels in the portions of the trail closest to the Project area are relatively low in comparison with those in the westernmost part of the county, particularly in the area near Snoqualmie Pass where the Trail is closer to the population centers of the Puget Sound area, the scenery is more outstanding and where the Trail ties in with other recreational facilities. Because of the Trail's character as an engineered right-of-way that has a wide gravel surface and is paralleled with utility lines, its visual sensitivity is assumed to be lower than that of a more conventional park or wildland trail. In light of the Trail's visual character, the moderate level of trail use this segment receives, and the middle ground viewing distances toward the Project area, the level of sensitivity of views from the Trail to potential Project visual effects is low.

5.1.4.3.8 Thorp

Landscape Description and Scenic Quality:

Simulation View 12 on Figure 15a, Exhibit 22-3, is a view toward the Project site taken from Thorp Highway in the center of the small, unincorporated community of Thorp. The ridgelines on which the Project is proposed for development lie three miles and further to the north, and form the backdrop of the view. The existing level of visual quality of the view toward the Project site is moderate, reflecting moderate levels of vividness, unity, and intactness.

Visual Sensitivity:

No data is available on traffic volumes on Thorp Highway in Thorp where Simulation View 12 is located, but based on land uses and field observations; it is assumed that traffic volumes are moderate. Given the moderate levels of traffic in this area, the Project area's location in the far middle ground of the view, and the fact that the Project area does not lie within the primary cone of vision of views from the road, the sensitivity of traveler views in this area to potential Project visual effects is considered to be low.

There are a total of approximately 118 residences in Thorp and the immediately surrounding area. From many of these residential properties, views toward the ridgeline are screened to some degree by other structures and by trees and other vegetation in the near foreground of the views. However, from other properties in the community, the ridgelines on which the Project is proposed for development are visible. Because these ridgelines are a part of the far middle ground zone of the view, the sensitivity of the residential views in this area to changes that might result from the Project is moderate at most.

5.1.4.3.9 Sunlight Waters

Landscape Description and Scenic Quality:

Sunlight Waters is a small lot subdivision that lies in the middle of a region of large ranch parcels located between I-90 and the Yakima River. This development, which is partially

built out, contains a golf course and a total of approximately 150 dwellings located on an upper and a lower terrace above the south bank of the River. From some areas of this development, there are views toward the ridges on which the Project is proposed, which lie about 2.8 miles and further to the east. Simulation View 13 on Figure 16a, Exhibit 22-3, is a view toward the Project site from Highline Loop, a high point in the upper terrace area which provides the fullest and least obstructed views toward the Project area. The existing visual quality of views from this area toward the site are moderately high to high, reflecting a high levels of vividness and unity. The level of intactness is reduced to some degree by the towers located in the BPA transmission corridor that are prominently visible along the top of the first line of ridges in the view.

Visual Sensitivity:

Although views toward the Project site from this area are open, and some residences are oriented toward this view, the sensitivity of residential views in this area to potential Project effects is moderate at most because of the distance of the viewers from the Project area.

5.1.4.3.10 Interstate-90

Landscape Description and Scenic Quality:

Interstate 90, the most important east/west cross-state route in Washington, angles through the upper Kittitas Valley on an alignment that lies approximately 2.5 miles southeast of the Project site. WDOT figures indicate that in 2001, the average daily traffic on I-90 in this area was 21,000 vehicles per day. From some areas along I-90 in the general Project vicinity, views toward the ridges on which the Project will be developed are screened by topography, trees, and other features in the foreground of the view. In many areas, however, these ridges are clearly visible in views across an open valley landscape. It is important to note, though, that the views toward the Project area from I-90 are at a right angle to the road and do not fall within the primary cone of vision of drivers. Simulation View 14 on Figure 17a, Exhibit 22-3, is a view toward the Project area from I-90 at Springwood Ranch, a point along the highway that is approximately 2.5 miles from the closest proposed turbine location. In this area, the visual quality of views toward the Project site is high, reflecting the high level of vividness attributable to the presence of the peaks of the Stuart Range in the far background of the view, and the view's relatively high levels of unity and intactness. The 100 mile segment of I-90 beginning at the Seattle waterfront and extending east to Thorp was designated as a National Scenic Byway by the Federal Highway Administration in 1998. This highway segment is also a part of the Mountains to Sound Greenway. The greenway, which consists of the corridor along I-90 from downtown Seattle to Thorp, is conceived of as a scenic, historic, and recreation corridor intended to function as a scenic gateway to the Seattle metropolitan area and a pathway to nature for the metropolitan area's population. The greenway concept has provided a framework within which the Mountains to Sound Greenway Trust, a private non-profit organization and state and federal agencies have been able to plan and implement measures to acquire, protect, and develop lands along the corridor that provide recreational opportunities and/or protect natural, historic, and scenic resources.

Visual Sensitivity:

The sensitivity of views from this area to potential visual changes associated with the Project is moderate, reflecting on the one hand, the very high numbers of roadway users and I-90's Scenic Byway status, and on the other, the fact that the views toward the Project site do not

fall within the primary cone of vision of drivers, and appear in the far middle ground of the view.

5.1.4.3.11 Lower Green Canyon Road

Landscape Description and Scenic Quality:

Simulation View 15 on Figure 18a, Exhibit 22-3, is a view looking northwest toward the Project site from a viewpoint on Lower Green Canyon Road in the area between Highway 97 and Clarke Road. This view represents views in the portion of the Kittitas Valley northwest of Ellensburg, where the Project area is visible across the flat valley lands on the distant hillsides that frame the northwestern edge of the valley. In the upper valley, viewing distances to the Project site range from approximately 2 to over 8 miles. In the view from Simulation Viewpoint 15, the Project site lies approximately 5 miles in the distance. The upper valley is highly rural in character, and the landscape consists of large farms and ranches and a scattering of non-farm residences on smaller parcels. In general, views from this area toward the Project site have a moderately high to high level of visual quality.

Visual Sensitivity:

Taking into account the relatively large numbers of residential and roadway viewers in this area on the one hand, and the distant nature of the views on the other, the sensitivity of traveler and residential views from this area to the potential changes that might be brought about by the Project is no more than moderate.

5.1.4.3.12 Ellensburg

Landscape Description and Scenic Quality:

The outer edges of the city of Ellensburg lie approximately 11 miles to the southwest of the Project site. From most areas of the city, views toward the Project site are blocked by structures and trees in the foreground of the view, although there are a few locations in parking lots and other open areas in the community where the ridges on which the Project will be developed are visible in the far distance. Simulation View 16 on Figure 19a, Exhibit 22-3, is a view from Reed Park, a small park located on an elevated knoll in the neighborhood southeast of Central Washington University in Ellensburg. Because of its elevated location, this park provides Ellensburg's most complete and unobstructed view toward the Project site. This viewpoint is located approximately 13 miles from the site of the closest proposed turbine. The existing level of visual quality of this view is high, reflecting the very high level of vividness created by the presence of the Stuart Range in the far distance of the view, and moderate levels of visual unity and intactness.

Visual Sensitivity:

Although there are large numbers of potential viewers in Ellensburg, the level of sensitivity of views from Ellensburg is low because the areas from which views toward the Project can be seen are limited and because the Project area is in such a distant portion of the view.

5.1.4.4 Environmental Impacts of the Proposed Action

5.1.4.4.1 Analysis Procedure

The impact analysis is based primarily on the Federal Highway Administration (FHWA) methodology for determining visual resource change and assessing viewer response to that change (US DOT, 1988). The analysis is focused on evaluating impacts and recommending measures to minimize adverse visual effects. Central to this assessment is an evaluation of representative public views from which the Project would be most visible. To document the visual changes that would occur, visual simulations show the proposed Project from a set of 16 viewpoints selected to be representative of views toward the Project from a range of locations. The visual simulations are presented as “before” and “after” images from each of these simulation viewpoints. Presented as Figures 4 through 19 in Exhibit 22-3, the simulation images provide a clear image of the existing character and quality of the views from each of the simulation viewpoints and of the scale, and visual appearance of the changes that would be brought about by the proposed Project. The computer-generated simulations are the result of an objective analytical and computer modeling process and are accurate within the constraints of the available site and Project data.

The simulations were developed using photographs taken with a digital camera, using a wide-angle 28 mm focal length. The Photomontage module of the WindPro software program (a widely accepted and applied program used for planning and assessing wind generation projects) was used to carry out the computer modeling and rendering required to produce the images of the Project facilities that were superimposed on the photographs to create the simulations. Existing topographic and site data provided the basis for developing an initial digital model. The Applicant provided site plans and digital data for the proposed wind turbines. These were used to create three-dimensional (3-D) digital models of these facilities. These models were combined with the digital site model to produce a complete computer model of the wind farm. For each viewpoint, viewer location was digitized from topographic maps, using 5 feet as the assumed eye level. The WindPro program overlaid computer “wire frame” perspective plots on the photographs of the views from the Simulation Viewpoints to verify scale and viewpoint location. Digital visual simulation images were produced as a next step based on computer renderings of the 3-D model combined with high-resolution digital base photographs. The final “hardcopy” visual simulation images that appear in this document were produced from the digital image files using a color printer.

The visual impact assessment was based on evaluation of the changes to the existing visual resources that would result from construction and operation of the Project. These changes were assessed, in part, by evaluating the “after” views provided by the computer-generated visual simulations and comparing them to the existing visual environment. Consideration was given to the following factors in determining the extent and implications of the visual changes:

- The specific changes in the affected visual environment’s composition, character, and any specially valued qualities;
- The affected visual environment’s context;
- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration; and
- The relative numbers of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by the expected changes. Particular consideration was given to effects on views identified as having high or moderate levels of visual sensitivity.

Levels of impact were classified as high, moderate, and low. In general, High levels of aesthetic impacts were assigned in situations in which turbines would be highly visible in areas with sensitive viewers, and would alter levels of landscape vividness, unity, and intactness to the extent that there would be a substantial decrease in the existing level of visual quality. Moderate levels of aesthetic impact were assigned in situations in which turbines would be visible in areas with high levels of visual sensitivity in which the presence of the turbines would alter levels of landscape vividness, unity and intactness to the extent that there would be a moderate change in existing visual quality. Moderate levels of visual impact were also found in situations in which the presence of turbines in the view would lead to more substantial changes in visual quality, but where levels of visual sensitivity were moderate to low. Low levels of visual impact were found in situations where the Project would have relatively small effects on overall levels of landscape vividness, unity, and intactness and/or where existing levels of landscape aesthetic quality are low or where there are low levels of visual sensitivity.

5.1.4.4.2 Project Appearance

The physical elements of the Project are described in detail in Section 2.3 ‘Construction On-Site’. Exhibit 01, ‘Project Site Layout’, is a general site layout that indicates the locations of the proposed roads, overhead and underground transmission lines, substation, operations and maintenance facility, and other features that comprise the Project.

The Project will include up to 121 turbines. The turbines will be mounted on tubular steel towers that will be approximately 18 feet in diameter at the base and will rise to a hub height of about 213 feet. Each tower will support a nacelle that houses a drive train, gearbox, generator, and other generating equipment. The nacelles will be approximately 30 feet long, 11 feet wide and 12 feet high and will be completely sheathed in an aerodynamically shaped fiberglass or metal shell. The rotors will be attached to the front of the nacelles, which are mounted on the tops of the towers. The rotors will have three blades, and will have a diameter of 213 feet to 236 feet. Although not required for functionality, each rotor will have an aerodynamic appearing nose cone to improve its appearance. The dimensions provided here represent the range of sizes of the various turbine models being considered for this Project. The Applicant is considering several turbine models from different vendors. The final decision regarding turbine and tower dimensions is driven largely by Project economics such as turbine pricing and the performance of specific turbines under different wind conditions. Given the relatively low wind shear at the Project site, it is not anticipated that taller towers will be necessary. The primary difference among the turbine models being considered is the rotor diameter, which range from 62 meters to 80 meters. Most of the visual simulations presented here are based on a turbine with a hub height of 210 feet and a rotor diameter of 203 feet, which are representative of the dimensions of the turbines that are being considered for the Project. For two of the simulation views, simulations are provided of the turbines with dimensions at the high end of the dimension range (Exhibit 22-3, Figures Vis 4c and Vis 6c) to permit the appearance of the slightly larger turbines to be compared with that of the slightly smaller turbines that have been simulated.

The surfaces of the turbine towers, rotors, and nacelles will be neutral gray in color and will be given a finish that has a low level of reflectivity.

The power generated by the turbines will be delivered to the Project substation by means of a largely underground electric collection system. Small, pad-mounted transformers located at

the base of each turbine tower will convert the electricity produced by the turbine to a transmission voltage of 34.5 kV and will connect to the underground collection lines. Each of the transformers will be housed in a metal-sided case that is approximately 8 feet wide, 8 feet long, and 8 feet high. The transformer housings will be painted in earth tone colors using paint with a low-reflectivity finish. An approximately 1.2 mile long segment of the collection system connecting the eastern and western portions of the Project may be above ground due to the large amount of power flowing through this portion of the collection system. This line would run from near the northern end of Hayward Road (String D) to near the junction of Bettas Road and Highway 97 (substation). This portion of the system would be carried on single wood poles with dual cross arms that are 40 to 50 feet tall. The overhead portion of the transmission system will utilize non-specular conductors and insulators that are non-reflective and non-refractive.

The network of roads that will provide access to each of the turbines will consist of both existing and new roads which will have a standard width of 20 feet and a compacted gravel surface. In areas with steeper slopes, cutting and filling will be required to keep grades below 15%.

The proposed operations and maintenance (O&M) facility is planned for an approximately 2-acre site located in the flat area along the north side of the southern end of Bettas Road in the area just west of its intersection with Highway 97. This area is visible in Exhibit 22-3, Photo 6 on Figure 3c. To construct this facility, the existing shrub-steppe vegetation on the site will be removed and the site will be graded and fenced. The primary structure in the O&M facility will be a main building that is approximately 50 feet wide, 100 feet long, and 35 feet high. This building will house offices, spare parts storage, and a shop area. This building will be steel framed and will have steel siding that will be painted with low reflectivity paints in earth-tone colors that blend well with the surrounding landscape. The outdoor areas devoted to parking and vehicle turning will be paved with asphalt in areas that are heavily used and with gravel in less frequently used areas. The color of the asphalt and gravel used on the site will be selected to minimize contrast with the colors of the surrounding landscape. Naturalistic groupings of indigenous trees and shrubs will be established in the area surrounding the O&M facility to provide partial screening and to integrate it into the landscape setting.

Two sites have been proposed as locations for Project substations. One of the sites would be located adjacent to the proposed O&M facility along the north side of the southern end of Bettas Road just west of its intersection with Highway 97, and would tie into the adjacent PSE 230-kV Rocky Reach to White River transmission line. The other site is located approximately 800 feet southwest of this site, on the sloped area south of Bettas Road and immediately north of the BPA transmission corridor. It is possible that either or both of these sites would be developed. In either case, the substation would occupy an area of 2 to 3 acres that would need to be cleared and graded. Because of the sloped terrain, considerable grading would be required to accommodate a substation on the site adjacent to the BPA corridor. The primary elements of a substation on either site would include a small control building, large transformers, structures housing switchgear, bus work, steel support structures, a transmission take-off tower, lightning suppression structures, outdoor lighting, and a perimeter chain link fence. The tallest structures would be the transmission take-off structures, which would be on the order of 60 feet high. The bus work and steel support structures would be in the range of 40 to 45 feet high. The transformers, switchgear structures, and control building would be no more than 12 to 15 feet in height. Although the substation control buildings would be painted

an earth-tone color using low-reflectivity paints, the substation equipment would have a standard low reflectivity neutral gray finish.

5.1.4.4.3 Light and Glare

To respond to the Federal Aviation Administration's aircraft safety lighting requirements, the Project will be marked with lights that flash white during the day (at 20,000 candela) and red (at 2,000 candela) at night. These lights are designed to concentrate the beam in the horizontal plane, thus minimizing light diffusion down toward the ground and up toward the sky. The exact number of turbines that will require lighting will be specified by the FAA after it has reviewed final Project plans; however, typically, FAA has required that warning lights be mounted on the first and last turbines of each string, and every 1000 to 1400 feet on the turbines in between. Aside from the aircraft warning lights, the turbines will not be illuminated at night.

At the O&M facility, outdoor night lighting will be required for safety and security. This lighting will be restricted to the levels required to meet safety and security needs. Sensors and switches will be used to keep lights turned off when not required. All lights will be hooded and directed to minimize backscatter and illumination of areas outside the O&M site. The lighting, paving and landscaping mitigation measures proposed for the O&M facility would be applied to the substation(s) as well.

5.1.4.4.4 Construction

The on-site activities that will be required as a part of Project construction are described in Section 2.3 'Construction On-Site'. Project construction is expected to take place over a period of 12 months. During that time, a staging area will be set up at the site of the proposed O&M facility along Bettas Road just west of Highway 97 that will be used for storage of turbine components, equipment, and vehicles. Grading will be required to create access roads and 30 by 60-foot flat, gravel-covered areas at the base of each tower site that will accommodate the cranes required to erect the turbines.

5.1.4.5 Assessment of Visual Effects

5.1.4.5.1 Short Term Construction Impacts

During the construction period, large earth moving equipment, trucks, cranes, and other heavy equipment will be highly evident features in views toward the Project site from nearby areas. At some times, small, localized clouds of dust created by road-building and other grading activities may be visible at the site. Because of the construction-related grading activities, areas of exposed soil and fresh gravel that contrasts with the colors of the surrounding undisturbed landscape will be visible. In close-at-hand views, particularly those seen by travelers on the segment of Highway 97 that passes through the Project site, and those seen from the closest residences, the visual changes associated with the construction activities will be highly visible and will have a moderate to high level of visual impact. From more distant viewing locations, the visual effects will be relatively minor and will have little or no impact on the quality of views. It is important to note that because construction activities take place over a period of only 12 months, the construction impacts will be relatively short in duration. After construction, is complete, all construction-related debris

will be removed from the site and any other non-road surface areas disturbed during construction will be replanted to recreate the appearance of their original vegetative cover.

5.1.4.5.2 Long-Term Impacts During the Project Operation Phase

The Project's aesthetic impacts during the operational period are summarized in Table 5.1.4-2, and presented in more detail in Table 5.1.4-3. As these tables indicate, the Project has the potential to create High levels of visual impact at several points along Highway 97, at the residential area along Sagebrush Road in the Highway 97 corridor, and in views from residences in the ridgeland east of Highway 97. Moderate levels of impact would occur at other points along Highway 97, in views from residences along Bettas Road, in views from Highway 10, and in views from the Sunlight Waters residential development. From all the other areas evaluated, the Project's impacts on aesthetics would be minimal.

Table 5.1.4-2 Summary of Impacts to Visual Resources During Project Operation					
Viewing Area	Existing Visual Quality	Visual Sensitivity	Distance to Closest Turbines (in miles)	Number of turbines visible	Potential Level of Visual Impact
Highway 97 Corridor					
Simulation View 1	Moderately Low	Moderate	0.8	Approximately 40	Low to Moderate
Simulation View 2	Moderate	High	0.4	9	Moderate to High
Simulation View 3	Moderate	High	0.5	5	Moderate
Simulation View 4	Moderately Low to Moderate	Moderate to High	0.9	More than 70	Moderate to High
Ridgeland East of Highway 97 Simulation View 5	High	Moderate	0.7	Approximately 40	Moderate to High
Bettas Road Simulation View 6	Moderately High	Moderate to High	0.5	10	Moderate
Highway 970/Hidden Valley Simulation View 7	Moderately High	Moderate	3	11	Low
Hayward Hill (no simulation prepared)	Moderately Low to Moderate	Low			Low
Highway 10 Corridor					
Simulation View 8	Moderate	High	1.25	7	Moderate
Simulation View 9	Moderate	High	1.5	14	Moderate
Simulation View 10	Moderately High	High	2	11	Low
Iron Horse Trail Simulation View 11	Moderately High	Low	2	Over 30	Low
Thorp Simulation View 12	Moderate	Moderate	3	Over 20	Low

Table 5.1.4-2 Summary of Impacts to Visual Resources During Project Operation					
Sunlight Waters Simulation View 13	Moderately High to High	Moderate	2.8	Over 40	Moderate
I-90 Simulation View 14	High	Moderate	2.5	Over 20	Low
Upper Kittitas Valley Simulation View 15	Moderately High to High	Moderate	5	116	Low
Ellensburg Simulation View16	High	Low	13	116	Low

Table 5.1.4-3
Analysis of Impacts to Visual Resources During Project Operation

Simulation Views	Existing Level of Visual Quality	Level of Visual Sensitivity	Assessment of Visual Change	Potential Level of Visual Impact
Highway 97 Corridor				
Simulation View 1 (Exhibit 22-3, Figures 4a and 4b) Highway 97 at Ellensburg Ranches Road looking north	Moderately Low	Moderate	Approximately 40 turbines will be visible on the ridge tops in the center of the view at distances of 0.8 to 3 or more miles. Although the turbines will in reality be considerably taller than the existing transmission towers, because they will be sited behind the transmission towers, they will, for the most part, appear to be similar to them in scale. About half the turbines will be visually absorbed by the landscape backdrop to some degree, but the other half will be silhouetted against the sky, increasing their visual salience. The presence of the turbines will reduce the scene's degree of intactness to some extent by introducing a large number of highly visible engineered vertical elements, but because the pattern that the turbines will form will be consistent with the pattern created by the existing transmission towers, they will not substantially change the scene's degree of visual unity.	Low to Moderate
Simulation View 2 (Exhibit 22-3, Figures 5a 5b, and 5c) Highway 97 north of gravel pit looking north	Moderate	High	From this viewpoint, 9 turbines will be visible on top of the ridge defining the east side of the ridge at distances ranging from 0.4 to 1.0 miles. Because the turbines will be seen against the sky at relatively close range, they will be highly visible in this view. These turbines will be new and visually dominant constructed features in a landscape setting that now has a relatively high degree of visual unity, and will reduce that unity to a degree that will substantially alter the scene's existing character. It can be argued that because the turbines have an attractive design and are sited along the ridgeline in an orderly and uncluttered way, that their presence will not necessarily create a change the in the setting's existing moderate level of visual quality. Exhibit 22-3, Figure 5c simulates the turbines as they would appear with use of brown paint. Under this alternative, the contrast of the turbines with their sky backdrop and their visual salience and effect on the	Moderate to High

Table 5.1.4-3
Analysis of Impacts to Visual Resources During Project Operation

			view would be intensified. It is likely that the effects of the Project on views of northbound travelers along this area of the highway will be a little less than suggested by this simulation because the photograph on which the simulation is based was taken from the west side of the road, where the ridge top area is more visible. On the east side of the road where northbound travelers would be located, views toward the ridgetop and the turbines would be constrained to some degree by the proximity of the slope to the side of the road.	
Simulation View 3 (Exhibit 22-3, Figures 6a and 6b) Highway 97 at northern end of Bettas Road looking south	Moderate	High	10 turbines will be prominently visible in the driver's cone of vision in the ridgetop area along the east side of the road. These turbines will be located at distances ranging from approximately 0.5 to 1.0 miles from this viewpoint. Because the turbines will be seen against the sky at relatively close range, they will be highly visible in this view and will reduce the level of visual unity to a degree that will substantially alter the scene's existing character. Because the turbines have an attractive design and will be arrayed along the ridgeline in an orderly and uncluttered way, that their presence will not necessarily create a substantial change in the setting's existing moderate level of visual quality.	Moderate
Simulation View 4 (Exhibit 22-3, Figures 7a and 7b) Sagebrush Road looking north	Moderately Low to Moderate	Moderate to High	A total of more than 70 turbines will be visible to the east and north at distances ranging from 0.9 to over 4 miles from this viewpoint. Although most of the turbines will be seen against hills in the backdrop, which will reduce their visual salience to some degree, a number of the closer turbines and many of the turbines to the north will be seen silhouetted against the sky, which will increase their noticeability. The high visibility of the many of the turbines and the large numbers of turbines involved will reduce the visual intactness and unity of this view.	Moderate to High
Ridgeland East of Highway 97				
Simulation View 5 (Exhibit 22-3, Figures 8a and 8b) View looking south from residence in	High	Moderate	A total of approximately 40 turbines will be visible from this viewpoint. Three strings of turbines will be visible in the middle ground, and an additional two strings will be visible in the far middle ground. Because of the elevated viewing position, these turbines will be seen against the backdrop of the ridgetop's ground surface. The contrast between the light	Moderate to High

Table 5.1.4-3
Analysis of Impacts to Visual Resources During Project Operation

Section 35 at upper end of Elk Springs Road			color of the turbines and the darker color of the ground will create a moderate level of visual contrast, increasing the visibility of the turbines. Because of the elevated position of this viewpoint and its distance from the turbines, the turbines' apparent scale will be consistent with that of other features in the setting. The presence of the turbines will have little effect on the vividness of this view, but will reduce its overall sense of unity and intactness.	
Bettas Road				
Simulation View 6 (Exhibit 22-3, Figures 9a and 9b) View looking north along northern portion of Bettas Road	Moderately High	Moderate (views of travelers on road) High (views from residences)	10 turbines that are a part of String G will be visible along the top of the ridgeline, as close as 0.5 mile from this viewpoint. Although the turbines will be seen against the sky, their neutral gray color will reduce their contrast with the sky backdrop. The apparent height of the turbines will be relatively consistent with the heights of the trees in the foreground of the view, reducing the degree of scalar contrast. The presence of the string of turbines that accentuates the ridgeline could be thought of enhancing the vividness of this view. Because only a single string of turbines that have a clean design and form an orderly composition will be visible, the visual unity of this view will not be substantially reduced. However, the presence of the turbines will reduce the level of intactness, contributing to the creation of a moderate level of visual impact.	Moderate
Highway 970/Hidden Valley				
Simulation View 7 (Exhibit 22-3, Figures 10a and 10b) View looking east from viewpoint on northern portion of Hidden Valley Road	Moderately High	Moderate	11 turbines that are a part of String G will be visible on the top of the ridgeline visible in the distance nearly three miles away from this viewpoint. Although the turbines will be seen against the sky, their neutral gray color will reduce their contrast with the sky backdrop. Although the turbines appear taller than the trees and transmission tower along the ridgetop, at this distance, their apparent slimness and their neutral color causes them to fade into the sky backdrop, downplaying any scalar contrasts. The presence of the turbines has little effect on the vividness and unity of this view, but creates a slight decrease in the overall level of intactness.	Low
Hayward Hill				

Table 5.1.4-3
Analysis of Impacts to Visual Resources During Project Operation

Refer to photos 18 and 19 on Exhibit 22-3, Figure 3h	Moderately Low to Moderate	Low	Because of the low level of visual sensitivity of views in this viewing area, no visual simulations were prepared. In light of the low level of viewer sensitivity and the unexceptional visual resource values, it can be assumed that the level of the Project's impacts on this area's aesthetic values would be low.	Low
Highway 10 Corridor				
Simulation View 8 (Exhibit 22-3, Figures 11a and 11b) View looking west from a viewpoint along Highway 10 at Hayward Road	Moderate	High	A total of 7 turbines from Strings A, B, and D will be visible on the ridgeline located 1.25 miles and further from this viewpoint. The turbines will be seen against the sky, but their neutral gray color will reduce their contrast with the sky. Because of their low level of contrast and their apparent slimness, they will appear to fade into the sky backdrop to some degree, reducing the sense of a contrast in scale with the surrounding landscape. The presence of the turbines will have little effect on the vividness of this view, but would create a small degree of change in the view's overall levels of unity and intactness.	Moderate
Simulation View 9 (Exhibit 22-3, Figures 12a and 12b) View looking east from viewpoint along Highway 10 between Morrison Canyon and Swauk Creek	Moderate	High	14 turbines from Strings B and C will be visible on the ridgeline located 1.5 miles and further from this viewpoint. The turbines will be seen against the sky, but their neutral gray color will reduce their contrast this backdrop. Because of their low level of contrast and their apparent slimness, they will appear to fade into the sky to some degree, reducing the sense of a contrast in scale with the surrounding landscape. The presence of the long line of turbines may create a slight increase in the vividness of this view, may have a small adverse effect on the view's unity, and would have a more substantial effect on the view's level of intactness.	Moderate
Simulation View 10 (Exhibit 22-3, Figures 13a and 13b) View looking east from viewpoint along Highway 10 west of Swauk Creek	Moderately High	High	11 turbines from Strings A, B and C will be visible on the ridgeline located approximately 2 miles and further from this viewpoint. The turbines will be seen against the sky, but their neutral gray color will reduce their contrast with this backdrop. At this distance, because of their low level of contrast and their apparent slimness, they will appear to fade into the sky to a large degree, greatly reducing their visual salience and any sense of scalar contrast with the surrounding landscape. Because of their low level of visual salience, the turbines will have relatively small effects on this view's	Low

Table 5.1.4-3
Analysis of Impacts to Visual Resources During Project Operation

			levels of vividness, unity, and intactness.	
Iron Horse Trail				
Simulation View 11 (Exhibit 22-3, Figures 14a and 14b) View looking north from a viewpoint along the Iron Horse/John Wayne Trail at Taneum Road	Moderately High	Low	Over 30 turbines from Strings A, B and C and from strings on ridges located further to the north will be visible on the ridgelines located 2 miles and further from this viewpoint. The closer turbines will be seen against the sky, but their neutral gray color will reduce their degree of contrast with this backdrop. The more distant turbines will be seen against the slopes of distant hills, and under some lighting conditions, may contrast with their backdrop, increasing their visual salience. The turbines visible in this view will have little effect on this view's level of vividness, but will reduce its level of unity to a small degree and its level of intactness to a slightly greater extent. Because the sensitivity of this view to visual change is low, the moderate degree of visual change will result in a low level of overall visual impact.	Low
Thorp				
Simulation View 12 (Exhibit 22-3, Figures 15a and 15b) View looking north from the Thorp Highway in the center of the community of Thorp	Moderate	Moderate	Over 20 turbines from Strings A, B and C and from strings on ridges located further to the north will be visible on the ridgelines located 3 miles and further from this viewpoint. Most of the turbines will be seen against the sky, but their neutral gray color will reduce their degree of contrast with this backdrop, and at this distance, they will have a relatively low level of visual salience. Some of the turbines will be seen in front of the tops of the peaks of the Stuart Range, but because of their relatively low level of bulk at this viewing distance, will not detract from the views toward the Stuarts to a substantial degree. The turbines visible in this view will have little effect on this view's levels of vividness, unity and intactness and will result in a low level of overall visual impact to this view.	Low
Sunlight Waters				
	Moderately High to High	Moderate	Over 40 turbines from many of the Project's turbine strings will be visible on the ridgelines located 2.8 miles and further to the east and northeast of this viewpoint. All of the turbines will be seen against the dark, forested slopes of distant hills, and under some lighting conditions, may contrast with their backdrop, increasing their visual salience. The presence of the turbines will have little effect on the vividness of this view, but will have	Moderate

Table 5.1.4-3
Analysis of Impacts to Visual Resources During Project Operation

			some adverse effect on the view's unity, and because of the visual clutter introduced by the large number of turbines, will have a more substantial effect on the view's level of intactness. In light of this view's moderate level of sensitivity, the overall level of visual impact will be moderate.	
I-90				
Simulation View 14 (Exhibit 22-3, Figures 17a, 17b, and 17c) View looking northeast from I-90 at Springwood Ranch	High	Moderate	Over 20 turbines from Strings A, B C and E and from strings on ridges located further to the north and east will be visible on the ridgelines located 2.5 miles and further from this viewpoint. Some of the turbines will be seen against the sky, but their neutral gray color will reduce their degree of contrast with this backdrop. The more distant turbines will be seen against the slopes of distant hills, and under some lighting conditions, may contrast with their backdrop, increasing their visual salience. The turbines visible in this view will have little effect on this view's level of vividness, but will reduce its level of unity and intactness to a small degree. This small degree of visual change, when combined with the moderate level of visual sensitivity, will result in a low level of overall visual impact. Exhibit 22-3, Figure 17c is a simulation that illustrates the Project's visual effects under a scenario in which the turbines would be painted with an earth tone color rather than a neutral gray. In this view, the visual contrast of the turbines seen against the backdrop of distant hills would be lower, but the contrast of the turbines seen against the sky would be slightly higher. Although the relative visibility of the various turbines would change a little bit with the use of earth tone colors, the overall level of impact on this particular view would remain the same.	Low
Upper Kittitas Valley				
Simulation View 15 (Exhibit 22-3, Figures 18a and 18b) View looking northwest from Lower Green Canyon Road	Moderately High to High	Moderate	Nearly all of the Project's turbines will be visible on the ridgelines located in the background zone of this view, 5 miles and further from this viewpoint. Most of the turbines will be seen against the slopes of the ridges and more distant hills, and under some lighting conditions, may contrast somewhat with their backdrop, but at this distance, this contrast has little effect on their overall visual salience. Because the visual salience of the turbines will be relatively low, the turbines will have little effect on this	Low

Table 5.1.4-3
Analysis of Impacts to Visual Resources During Project Operation

			view's level of vividness, unity and intactness and will have only a small overall visual impact on this view.	
Ellensburg				
Simulation View 16 (Exhibit 22-3, Figures 19a and 19b) View looking northwest from Reed Park in Ellensburg	High	Low	Essentially all of the Project's turbines will be visible on the ridgelines located in the background zone of this view, 13 miles and further from this viewpoint. Nearly all of the turbines will be seen against the slopes of the ridges and more distant hills, and under some lighting conditions, may contrast somewhat with their backdrop, but at this distance, this contrast has little effect on their overall visual salience. Because the visual salience of the turbines will be low, the turbines will have little effect on this view's level of vividness, unity and intactness and will have only a small overall visual impact on this view.	Low

5.1.4.6 Light and Glare

Based on experience at the Stateline and Nine Canyon Wind projects in Washington, it appears that the white flashing lights that will be mounted on the turbines and flash during daylight hours as required by the FAA for daytime aircraft safety will be visible, but not particularly intrusive to viewers in the areas surrounding the Project and are thus unlikely to create a moderate or high level of visual impact. The flashing red lights (2,000 candela) that the FAA requires be operated at nighttime will introduce a new element into the Project area's nighttime environment. At present, the Project site and surrounding area are relatively dark at night. The major sources of light in the area are floodlights and other outdoor lights at the residential properties located in the vicinity of the Project area, and headlights on the surrounding highways. The flashing red lights will be most noticeable in the areas within a mile or so of the Project, and are likely to be perceived as having an adverse effect on views from residential properties in these areas.

The Project's O&M facility and substation(s) will create sources of light in areas where there are no nighttime sources of light other than the headlights of vehicles on adjacent roadways. However, the impacts of the lighting associated with these facilities will not be substantial. As indicated previously, some night lighting will be required for operational safety and security, but mitigation measures will be put into place to restrict this lighting to the minimum required and to attenuate its effects. High illumination areas not occupied on a regular basis will be provided with switches or motion detectors to light these areas only when occupied. At times when lights are turned on, the lighting will not be highly visible offsite and will not produce offsite glare effects because lighting will be restricted by specification of non-glare fixtures, and placement of lights to direct illumination into only those areas where it is needed. The naturalistic plantings of indigenous trees and shrubs to be installed in the areas around these facilities will further reduce the visibility of their night lighting.

5.1.4.7 Mitigation Measures

Mitigation measures that have been made an integral part of the Project's design include:

- During the construction period, active dust suppression will be implemented to minimize the creation of dust clouds;
- When construction is complete, areas disturbed during the construction process will be restored to natural appearing conditions;
- The wind turbine towers, nacelles, and rotors used will be uniform and will conform to the highest standards of industrial design to present a trim, uncluttered, aesthetically attractive appearance;
- The turbines will have neutral gray finish to minimize contrast with the sky backdrop. Comparison of simulations of towers with a neutral gray finish with simulations of towers with an earth-tone brown finish (Simulation Views 2 and 14) indicate that although the earth tone finish reduces visual contrast in views in which the turbines are seen against a landscape backdrop, it accentuates the visibility of the turbines in views in which they are seen against the sky. Because the turbines are most frequently seen against the sky, particularly in close range views where visual concerns are the greatest, the gray finish is the better choice for minimizing Project aesthetic impacts;
- A low-reflectivity finish will be used for all surfaces of the turbines to minimize the reflections that can call attention to structures in a landscape setting;
- Because of the prevailing wind conditions and the high level of reliability of the equipment being used, the rotors will be turning approximately 80-85% of the time, minimizing the

amount of time that turbines will appear to be non-operational, a condition that the public often finds to be unattractive⁸;

- The small cabinets containing pad-mounted equipment that will be located at the base of each turbine will have an earth-tone finish to help them blend into the surrounding ground plane;
- The only exterior lighting on the turbines will be the aviation warning lighting required by the FAA. It will be kept to the minimum required intensity to meet FAA standards. It is anticipated that the FAA will soon be issuing new standards for marking of wind turbines that will entail lighting far fewer turbines in a large wind farm than is now required, and having all the lights be synchronized. These potential regulatory changes are being closely monitored, and if, as is likely, they are made before Project construction begins, the aviation safety marking lighting will be redesigned to meet these standards;
- Nearly all of the Project's electrical collection system will be located underground, eliminating visual impacts;
- On the 1.2 mile segment of the electrical collection system that will be above ground, simple wooden poles, non-specular conductors (i.e. conductors that have a low level of reflectivity), and non-reflective and non-refractive insulators will be used. This line parallels two existing sets of overhead high voltage transmission lines and a paved road;
- To the extent feasible, existing road alignments will be used to provide access to the turbines, minimizing the amount of additional surface disturbance required. Access road widths will be restricted to 20 feet. The roads will have a gravel surface and will have grades of no more than 15%, minimizing erosion and its visual effects;
- The O&M facility building will have a low-reflectivity earth-tone finish to maximize its visual integration into the surrounding landscape;
- The colors of the asphalt and gravel used for circulation and parking areas at the O&M facility will be selected to minimize contrast with the site's soil colors;
- Outdoor night lighting at the O&M facility and the substations will be kept to the minimum required for safety and security, sensors and switches will be used to keep lighting turned off when not required, and all lights will be hooded and directed to minimize backscatter and off-site light trespass;
- At the substation(s), all equipment will have a low reflectivity neutral gray finish to minimize visual salience;
- All insulators in the substations and on takeoff towers will be non-reflective and non-refractive;
- The control buildings located at each substation would have a low-reflectivity earth-tone finish;
- The chain link fences surrounding the substations will have a dulled, darkened finish to reduce their contrast with the surroundings;
- In the areas surrounding the O&M facility and substations, naturalistic groupings of indigenous trees and shrubs will be established to provide partial screening and to visually integrate the facilities into their landscape settings.

5.1.5 Recreation

The listing of recreational sites within the area affected by construction and operation of the facility and description of impacts and of construction and operation are contained in Section 5.3.5, 'Public Service and Utilities-Parks and Recreation Facilities'.

⁸ This finding is supported by research by Thayer and Freeman (1987), among others.

5.1.6 Historical and Cultural Preservation

5.1.6.1 Introduction

RCW 27.53.060 provides protection of cultural resources on private and public lands in the state of Washington.

A cultural resources evaluation was implemented to identify and assess any potential impact on cultural resources located within the Kittitas Valley Wind Power Project area. These resources may include previously documented or undocumented historic, cultural and archaeological resources as well as traditional cultural properties. To determine if the Project area contains any significant cultural deposits, Lithic Analysts was contacted to conduct an extensive and systematic on-ground cultural resource survey of the proposed Project area. This included a pedestrian archaeological survey of all turbine generator and turbine string locations as well as the proposed Project substations, existing and new access roads, and any overhead or underground electrical lines. The pedestrian survey was conducted in October 2002.

5.1.6.2 Regional Context

The Project area is located approximately about 12 miles northwest of Ellensburg, and 12 miles southeast of Cle Elum. The Project sits on a series of ridge tops running north/south above the upper Yakima River, in the area often called the Kittitas Valley. The Yakima River flows over 200 miles from its headwaters at the outlet of Keechelus Lake near Snoqualmie Pass to the confluence with the Columbia River at Richland. The upper Yakima River or Kittitas Valley is that portion of the river stretching north of the Yakima Canyon to the headwaters. After the river passes from its high mountain source eastward down from the mountains, the Kittitas Valley opens up east of Cle Elum to a broad valley floor as the landscape sheds layer after layer of green to reveal a scenery of golden browns and yellows. The Wenatchee National Forest is north of the Project area, and the Columbia River is due east.

The Project area receives an annual effective precipitation rate of less than nine inches. The Project area lies within the *Artemisia tridentata/Agropyron spicatum* association of the shrub-steppe vegetation environmental zone (Franklin and Dyrness, 1988:217). This zone occupies the center of the Columbia Basin Province and extends west to the foothills of the Cascade Range. It is often referred to as the Columbia Plateau, an area of about 63,000 square miles of the Columbia River drainage basin.

The Columbia River Basalt formation dominates the underlying geology of this Project area. This formation was the result of an outpouring of a long sequence of Miocene lava flows covering an area of over 500,000 square miles. Individual lava flows were about 27 to 100 feet thick, with a total thickness of 2,000 to 5,000 feet (Franklin and Dyrness, 1988:29). Interspersed between layers of basalt are interbeds of sedimentary deposits called the Ellensburg Formation. It is within these layers that opal, chalcedony, jasper, and chert are found. Prehistoric knappers utilized these lithic materials for flaked stone tool manufacture. Glaciers, 2,000,000 to 10,000 years ago, further carved the Project area, helping to create the narrow, rocky ridges upon which the proposed wind turbines will be erected. For a detailed discussion concerning the geology of the Project area, see Section 3.1, 'Earth'.

5.1.6.3 Prehistory

Culturally, the area is referred to as the Southern Plateau, which stretches from the Okanogan Highlands in the north to the Bitterroots in the east, the southern edges of the Deschutes and John Day Rivers in the south, and the crest of the Cascade Mountains in the west. Within the Southern Plateau, the Kittitas or Upper Yakima and others occupied the subregion called the South-central Plateau (Ames, et.al., 1998). During ethnographic times, the predominant language of the Southern Plateau was Sahaptin, of which the Kittitas spoke the NW dialect along with the Yakima, the Klickitat, the Upper Cowlitz or Taitnapam and the Upper Nisqually (Kincade, et.al., 1998).

There are numerous chronological sequences or phases that have been proposed for the archaeological record on the Columbia Plateau. These assigned phases generally are an effort to place documented cultural material remains within a certain framework. Chronologies usually rely heavily on projectile point characteristics or morphology—instead of technology—to place an archaeological site with a particular prescribed phase. No attempt has been made here to discuss Plateau cultural history within such a context. Rather, the many archaeological studies for the area have been synthesized to arrange Plateau cultural history into three general periods ranging from about 11,500 years ago to A.D. 1720 (Adapted from Ames, et. al., 1998, unless otherwise noted). Following is a brief summary of these time frames. They are strictly academic and do not necessarily reflect tribal viewpoints.

5.1.6.3.1 Period I. 11,500 years ago to 5000/4400 B.C.

Period IA dates from 11,500 to 11,000 years ago. The Richey-Roberts Clovis Cache is the only known site on the Southern Plateau containing intact deposits of this age. Other evidence of these earliest occupations consists entirely of surface finds. There is little available evidence of cultural continuity from Clovis to later-dating periods, though a strong connection with other regions to the south and east is implied. Period IA sites have not been identified in the South-central Plateau.

Period IB dates from 11,000 years ago to 5000/4400 B.C. Post Clovis cultures practiced a broad-spectrum hunter-gatherer subsistence strategy consisting of high seasonal and annual mobility, low population densities, and a technology suited for maximum flexibility. In that economy, wide ranges of foods were exploited. People moved frequently and left no evidence of dwellings or structures.

The great majority of Period IB sites, particularly those dating prior to 7000 B.C., are concentrated in the central and eastern portions of the region. Most major sites are located along the Columbia and Snake Rivers and tributaries; sites are also documented in the surrounding plateaus and mountainous uplands, indicating that all regional environments were used. A documented Period IB archaeological site is located at Ryegrass Coulee near Vantage, due east of the Project area on the Columbia River

5.1.6.3.2 Period II. 5000/4400 to 1900 B.C.

Semi subterranean pit houses appear in the archaeological record for the first time along with evidence of increased exploitation of certain nutritious roots and salmon. Less investment is made in the manufacture of stone tools as judged by their decline in quality. Semi subterranean pit houses are seven to eight meters across, circular to rectangular in plan view, and one to two meters deep. The houses generally lack evidence of superstructures and their contents include clusters of large hopper mortar bases and anvils resting on their floors. The presence of semi subterranean pit houses likely represents a region-wide shift in settlement

patterns to some form of semisedentism. However, there are few dated dwellings in the region 2000 to 1800 B.C.

5.1.6.3.3 Period III. 1900 B.C. to A.D. 1700.

The beginning of this period is marked by the widespread reappearance of pit houses, increasing heavy reliance on fishing and storage of salmon, intensive exploitation of camas, and evidence of land use patterns that persisted into the 19th century. These land use patterns include seasonal (usually winter-early spring) villages in the canyons and exploitation of uplands and mountains from special use camps during the summer and fall.

By 500 B.C., pit houses were common and highly variable in size with evidence of superstructures. Large pit houses (diameters greater than 12 meters) became more common after A.D. 1000. Large concentrations of houses – towns and villages – also appeared in the record by A.D. 500; longhouses entered the archaeological record after A.D. 500. Like pit houses, net weights became quite common suggesting greater use of nets. While there is very little evidence of food storage pits in Periods I and II, storage pits with salmon remains are seen at the beginning of Period III. Period III is the only period in Plateau prehistory that is also represented by fiber and wood artifacts and other perishables.

Pit house sites are found along the Columbia and its tributaries and clusters of house pits have been located on terraces of very small streams that flow into larger rivers and in totally unexpected places.

Sub period IIIA. 1900 B.C. to A.D. 1

This sub period in the west-central Plateau reveals: increased population and sedentism, changes in subsistence patterns, large riverine villages and the appearance of communal villages, larger and more functional artifact assemblages, and an increase in trading of non-local items utilizing pre-existing trade networks. A greater diversity in the physical styles of housing and the larger numbers of dwellings documented during this period likely reflect an expanding regional population base.

Artifact assemblages are dominated by expedient tools, and salmon are a dominant component of faunal assemblages. Large mammals are also a principal source of food. Seasonal root and vegetable food gathering and raw material extraction were among the prominent activities pursued from upland camps.

Sub period IIIB. A.D. 1 to 1720.

This sub period marks the appearance of the ethnographically defined winter village pattern. By A.D. 1, pit houses are found among most salmon-bearing rivers and streams, and upland camps and use areas occur in expanded numbers. Hunting and hunting-related activities, plant gathering and processing and lithic quarries and collection areas are among the most common of site occurrences in these areas. The first documented examples of longhouses appear during Sub period IIIB.

The longhouse at Avy's Orchard (East Wenatchee), dated to A.D. 889, was a semi subterranean structure, implying an evolution to a surface structure found later. This change was most likely linked to the adoption of an equestrian lifeway over most of the region after A.D. 1720. Even though there were some changes in housing during sub period IIIB, the circular, semi subterranean pit house or mat lodge remained the dominant form of housing. These were easily adapted to a surface structure with the introduction of the horse and

increase in settlement mobility. The number and diversity of nondwelling structures, such as sweatlodges, also increased during this period.

Hunn (1990) states that the Plateau way of life remained “fundamentally the same” throughout prehistory until the rapid changes brought about by European American influences during the 1700s and later. Any changes noted represent subtle shifts of emphasis rather than profound redesign of Plateau economic and social patterns. As stated by Kirk and Daugherty (1978), culture change proceeded at a modest pace through the ages into the historic period. Events that drastically altered the subsistence patterns in Plateau life included the introduction of the horse, the spread of diseases, the fur trade and European American emigration onto native land (Hunn’ 1990).

5.1.6.4 Ethnography/Ethnohistory

As part of the Plateau cultural group, the Kittitas utilized a riverine settlement pattern, based upon sharing of diverse resources among bands of related and extended family groups. Beginning in April with root gathering—before the spring Chinook run at the Dalles—they followed a subsistence cycle referred to as the seasonal round, traveling to and from resource procurement grounds. Through spring, summer and fall, they gathered and processed various foods contained within the surrounding areas, including camas, bitterroot, lomatium and other roots, berries, fish, deer, elk and medicinal herbs and other plants and animals (Hunn 1990).

Celilo Falls and The Dalles, great fishing and trading centers, were located down river on the Columbia. Celilo Falls was the principal fishing area for the whole region. There were many other Columbia River fisheries all up and down the river—one at Priest Rapids, for example. Trading and fishing at The Dalles attracted not only the Kittitas, but people from as far away as the Northwest Coast, with trade items available from the Great Plains and Northern California. The Kittitas followed the trails from the Upper Yakima River through Union Gap and on south to Celilo. Other fisheries utilized by the Kittitas during the summer and early fall were located to the northwest at the outlets of Lakes Cle Elum, Keechelus, and Kachess—Lake Cle Elum being the largest (Schuster, 1990). In addition, fishing sites are found along the entire length of the Yakima River, and it is likely that campsites along many stretches in the Kittitas Valley were used for plant gathering and processing as well (DePuydt, 1990).

During ethnographic times, the Kittitas maintained close ties to both Sahaptin and Salish-speaking tribes (Ray 1936; Prater, 1981; Miller and Lentz, 2002), particularly the Wenatchee and Snoqualmie. The Kittitas were expert traders and maintained particularly strong trade relations with the Snoqualmie, and were known to winter with them at their village below Snoqualmie Falls (Prater, 1981). The Kittitas resided all along the upper Yakima River from near Cle Elum Lake to the Yakima Canyon. Camas could be dug near the village located at the mouth of the Teanaway River, also known as a gathering place to trade, gamble, play games and race horses (Schuster, 1975). There were many other villages and well-used trails in the Kittitas Valley (Ray, 1936). Ray placed nine villages in there, two located near the Project area. One village (kła’ła) was located about one mile above present-day Thorp, opposite the mouth of Taneum creek. This was the largest Kittitas village, with a population of approximately 500. The other (ti’plas) was located at the mouth of Swauk Creek, with a population of approximately 50 people.

As it is today, the Kittitas Valley for centuries served as a major transportation corridor across the region. Many trails dotted the local landscape, connecting the villages located at the head of Yakima Canyon with the area west of the Cascades. One trail (Ray, 1936) followed the southern banks of the Upper Yakima River west to the upper reaches of the Cle Elum River. Trails

extended north from the Yakima River trail into the mountains and to Wenatchee. Another crossed from the mouth of Naneum Creek to Reecer Canyon and then over to Swauk Creek well above the proposed Project area. Portions of present-day Interstate 90 (Prater, 1981) west of Thorp were literally constructed over the old ancient Indian trail leading westward across the mountains via Yakima and Snoqualmie Pass. Naches Pass was used by the Kittitas and other Yakima to reach Puget Sound to trade at Fort Nisqually (Glauert and Kunz 1976).

5.1.6.5 Historic Setting

The horse arrived in the Kittitas Valley around 1740, after being traded by the Shoshone to other Plateau Indians and then to the Kittitas. With the resulting increase in mobility, they could then travel greater distances, often to the Great Plains in pursuit of buffalo or to intertribal trade centers and social gatherings. Indians enjoyed competition in horsemanship. Skill in handling became a source of prestige. Status measurements changed and wealth was counted in horses, which thrived on upland grasses on the Plateau. Plateau people were thus influenced by the plains culture and adopted many of their practices, such as dress, dancing style, housing style, decorative beaded horse garments, European trade goods, and changes in inheritance patterns (Meinig 1968, Schuster 1990). Even so, riverine environments remained important and most groups retained their previous subsistence customs. Although horses and European trade items were acquired in the early part of the 18th Century, actual European-American contact began with the Lewis and Clark Expedition in fall 1805, well south of the Project area.

Fur traders soon followed Lewis and Clark, and in 1811 David Thompson placed a marker for the North West Company of Canada at the mouth of the Snake River, claiming the territory for Great Britain. By 1818, North West Company (later merged with Hudson's Bay Company in 1821) forts in Eastern Washington included Fort Nez Perce (later called Fort Walla Walla), Fort Spokane and Fort Okanogan (Meinig 1968).

Alexander Ross of the Northwest Company was the first white man to enter the Kittitas Valley in 1814, though he had passed by on his way up the Columbia in 1811. He came to the valley to purchase much needed horses at the Che-lo-han encampment, otherwise known as the Council Gathering Grounds, located near the present-day town of Kittitas. Ross estimated that Che-lo-han stretched for more than six miles. It was here that he counted over 3,000 Indians, not including women and children, and a vast herd of horses. Ross likely exaggerated his population count (Glauert and Kunz, 1976) to intrigue Eastern audiences. Nevertheless, it is quite true that large numbers of people gathered there from miles around to trade, gather and process roots, to race horses, trade horses and gamble.

Fur trading did not have the early impact on the Kittitas Valley that it did elsewhere. However, construction of Fort Vancouver by the Hudson's Bay Company in 1825 greatly increased contact with fur traders. Trading was also brisk with Fort Nisqually on Puget Sound. Rather than furs, the Yakima used their best asset, the horse, as a trading commodity to acquire all nature of trade items, such as guns, ammunition, beads, blankets, axes, knives and projectile points. Beef gradually became a staple in Indian diet. Some time after 1840, the Kittitas under Ow-hi and later Kamiakin began grazing their own herds in the valley (Schuster, 1990). They imported Black Spanish or Sandwich Island cattle from the Hudson's Bay Company at Fort Vancouver (Glauert and Kunz 1976). As with fur trading, initial European American settlement did not influence the Kittitas Valley as much as elsewhere because the land was not considered good for farming (Schuster 1990).

In May 1841, Lieutenant Charles Wilkes of the United States Exploring Expedition sent Robert Johnson from Puget Sound overland to assess the navigability of the Columbia River and explore the interior of the Columbia (Anglin, 1995). On his way, Lt. Johnson stopped in the Kittitas Valley to purchase fresh horses. His negotiations were not without difficulty because the Kittitas chief, Te-i-was, was reluctant to part with his best mounts. While there, Johnson learned that game was scarce and the beaver had all but disappeared. Johnson observed and recorded camas and other roots being dug by the women, as well as the method of preparation by drying, pounding them into a mass between two stones and then baking them in an oven. Johnson also observed a patch of potatoes being cultivated near the Columbia River within a small square of land surrounded by turf walls (Wilkes, 1845).

Previous to the Wilkes Expedition, the Kittitas Valley, as part of the Oregon Territory, was governed under joint occupancy between the British and Americans. It wasn't long after that, in 1846, that the boundary dispute was put to rest and the Oregon Territory was established below the 49th Parallel. Once that happened, the number of American missionaries and settlers increased throughout the region. Catholic missions were established in the Yakima River Valley in 1847 (Schuster 1982) at the invitation of Ow-hi (Ricard, 1976). Most missions were located a distance away from the Project area at Ahtanum and on Manastash Creek (Glauert and Kunz, 1976). There was possibly one, however, at the mouth of the Taneum on the Yakima River (Olmstead-Smith in Miller and Lentz, 2002). Few, if any, adult Indians were baptized or attended mass on a regular basis (Ricard, 1976). However, the Catholic fathers had an excellent relationship with the Indians, particularly Kamiakin, Ow-hi and Te-i-as. Father Pandosy often served as an interpreter and trusted counsel for them during negotiations with the United States Government (Glauert and Kunz, 1976). Tensions and fears were high throughout the region after the deadly attack on the Whitman Mission near Walla Walla. In addition, the Protestant settlers did not trust the Catholic Priests. Once hostilities broke out in the open in 1855, the Catholic mission at Ahtanum was sacked and burned by vigilantes (Hunn, 1990, Schuster, 1982).

The relative isolation of the Yakima Valley began to disintegrate in the 1850s as events proceeded rapidly. The Donation Land Act was passed and Indian lands in the Northwest were opened for settlement. White settlers began moving into areas on both sides of the mountains. Washington Territory was formed in 1853 and Isaac Stevens was appointed governor and Indian agent. Besides surveying a railroad route across the territory, Stevens's primary motivation was to gain legal and undisputed title to Indian land so settlement could proceed unobstructed (Hunn, 1990). At Stevens's direction, Captain George B. McClellan conducted a preliminary survey to construct a wagon trail over Naches Pass and surveyed the Kittitas Valley.

It was McClellan who first introduced the word "Kittitas" into the geographic lexicon, though it was later misspelled by Stevens's staff when they drew the maps. McClellan reported that his base camp was at Kittitas, the name of a nearby Indian encampment. In addition, the priest, Father Pandosy had baptized his first convert at that location and spelled it in his records as "Kittatash". Many meanings have been ascribed to the name, but the early frontiersman, Charles Splawn said that *kittit* means white chalk and *tash* means place of existence. There is a bank of such chalk on the Yakima River just south of Ellensburg. The chalk was used by the Indians to paint their faces and their horses (Glauert and Kunz, 1976)

Also in 1853, James Longmire brought the first wagon train of settlers through the territory and across Naches Pass to the Puget Sound region (Glauert and Kunz, 1976, Schuster, 1982). McClellan discovered gold in the Kittitas Valley in 1853, but no one paid much attention until larger mines were discovered in the Colville area in 1855. Tensions increased as miners rushed to cross through the Upper Yakima to reach the Colville, precipitating a closure of the area by

military order. Despite that, soldiers continued to look for gold, eventually discovering several nuggets on the Peshastin (Glauert and Kunz, 1976).

As a result of these events, Plateau bands began moving towards unification and confederation though they did not quite succeed. Yakima tribal leadership began to emerge through Ow-hi and Te-i-was of the Upper Yakima and their nephews Kamiakin, Showaway and Skloom of the Lower Yakima (Schuster, 1982). In the fall of 1854, Kamiakin called a council of all tribal groups on middle Plateau to meet at the Grand Ronde in Eastern Oregon. The purpose was to form a confederacy and organize resistance, but no agreement could be reached (Meinig, 1968).

Once the treaty negotiation process started, Governor Stevens was relentless in pursuit of his goals. He organized a series of grand treaty councils to be held at various locations around the territory. In June 1855, approximately 1,000 Yakimas led by Kamiakin, Ow-hi and Skloom along with other Plateau groups attended negotiations at the Walla Walla treaty grounds, at a place where they had often gathered in the past to trade. In return for ceding their territories, Indians were promised payment in goods, cash and other compensation and exclusive rights to bounded areas called reservations. In reality, their traditional ties were severed and they were denied access to hunting territories and resource procurement areas (Hunn, 1990, Schuster, 1982).

After lengthy discussions and negotiations in which most Indians just gave up so they could go home (Schuster, 1990), the treaty was signed at Walla Walla on June 9, 1855. It established a formal relationship between the U.S. government and the Yakima people. The treaty created the Consolidated Tribes and Bands of the Yakima Nation, now the Yakama Nation. Inadvertently, this formal relationship served to bind together formerly politically autonomous local bands into a nation with a formal sense of tribal unity (Schuster, 1982). As the Consolidated Tribes and Bands of the Yakima Nation, 14 formerly autonomous bands or tribes together ceded almost 11 million acres (29,000 square miles) more than one fourth of the State of Washington. In lieu of those lands, they retained approximately 1,200,000 acres (2,000 square miles) of land for their “exclusive use and benefit”. No white man was permitted to reside on the reservation without permission of the tribe (Hunn, 1990). This proved not to be the case.

Within months after the signing of the treaties, Stevens announced that the territory was once again open for settlement. A veritable land rush began. The discovery of gold on the Colville further increased tensions as miners swarmed across the landscape. In September, some Yakimas attacked a group of trespassing miners who had molested Yakima women (Schuster, 1990). When the Indian agent came from The Dalles to investigate, he was attacked and killed by Showaway’s son. Soldiers sent to avenge the agent’s death were attacked and routed at Toppenish Creek by Kamiakin. Full-scale warfare resulted. In November the Oregon Mounted Volunteers, in pursuit of the Yakima out of Union Gap, looted and burned the Catholic Mission at Ahtanum (Glauert and Kunz, 1976, Schuster, 1982).

Colonel George Wright constructed a fort on the Naches and a base camp in the Kittitas Valley as a show of force, believing that the Indians would be persuaded to negotiate for peace. Even though he met with Ow-hi, no settlement could be reached. Wright then rounded up about 400 Kittitas and Wenatchee and transported them to Fort Simcoe to keep them away from other, more hostile bands. Hostilities continued throughout the Washington Territory until about September 1856. But in 1858, gold was again discovered, this time in British Columbia. Yet another group of miners was attacked while trespassing in Yakima lands. Lt. Jesse Allen retaliated and attacked a village at dawn in the Teanaway-Swauk area, killing three Indians. Lt. Allen also lost his life by friendly fire (Glauert and Kunz, 1976). The War in 1858 continued until a final surrender in September. Ow-hi turned himself in. His son, Qualchon was hanged in the mistaken belief that he

was responsible for the earlier death of the Indian agent. Ow-hi was killed while trying to escape. Skloom did not regain his lost prestige. Kamiakin fled to Canada where he lived to be 73 (Schuster, 1990). But, the will of the Indians was finally broken and they were gradually moved onto their reservations.

Congress ratified the treaty on March 8, 1859, and settlement of the Kittitas Valley continued. By the 1860s, cattle were being driven from the Yakima valley to the mines in Canada, and open range became the norm for the Columbia Plateau. Ranchers in the Kittitas Valley followed the example set earlier by Ow-hi and Kamiakin and took advantage of the abundant grass for feed. The area around Thorp was the most active ranching locale in the Kittitas valley by the end of the decade, and homesteading as well as ranching began to increase. After the Snoqualmie Wagon Road was completed in 1867, ranchers in the Kittitas Valley began to use it to drive cattle to Puget Sound (Prater, 1981).

Frederick Ludi and John Goller were the first permanent white settlers in the Kittitas Valley. They came from Montana Territory in 1867. Tillman Houser was the first settler to come into the Kittitas Valley from Puget Sound. He built a cabin for his family and planted wheat in 1868 north of present-day Ellensburg, then returned to the Sound to get his wife and children via the new Snoqualmie Wagon road. Fielding Mortimer Thorp and his father-in-law Charles Splawn soon followed from east of Yakima (Prater, 1981). They raised a herd of Durhams (Glauert and Kunz, 1976). They homesteaded at the mouth of Taneum Creek, near present-day Interstate 90 and the ancient Kittitas village site—a few miles south of the proposed Project area. Thorp and Splawn opened a small trading post and started the first mail route over Snoqualmie Pass, paying an Indian named Washington \$10 per round trip delivery. The first school in the Kittitas Valley was started by Charles Splawn. The first students were local Kittitas Indians (Prater 1981). The mill and granary at Thorp opened in 1883 and was in operation until 1946. The Thorp Mill is on the National Register of Historic Places (Kirk and Alexander, 1990).

No account of the history of the Kittitas Valley can go without mention of Robbers Roost, the trading post established in 1870 by Charles Splawn's brother Andrew Jackson Splawn and Ben Burch, who Splawn later bought out (Prater, 1981). They got their supplies from The Dalles and traded mostly with the local Indians and drovers on their way over Snoqualmie Pass because there were not many white families yet in the area. John Shoudy purchased Robbers Roost one year later and platted the town of Ellensburg (Kirk and Alexander, 1990).

Placer mining began in the Swauk Creek area in 1873. The center of the mining district was at Liberty, once called Meaghersville, the center of a small gold rush. Chinese workers were hired for \$2 to \$3 a day, but were driven out of the area by about 1884. Most claims were north of Liberty and well north of the Project area (Glauert and Kunz, 1976).

Specifically concerning the Project area, the U.S. Department of Interior, General Land Office (GLO, 1874), surveyed Township 19 North, Range 17 East in 1874. The surveyor noted a trail in the northeast corner of Section 22 and the eastern one-half of Section 16. Other surveyor comments included:

- Sections 14, 15, 22, and 23 – “land very broken and hilly: soil 3rd rate: bunch grass in abundance,” and;
- Sections 10, 11, 14, and 15 – “land very broken and hilly: soil 3rd rate: fit only for stock grazing.”

Township 20 North, Range 17 East, was surveyed much later in 1892 (GLO, 1892). This survey reflected an increase in Euroamerican activities. Several roads were labeled as “wagon roads to timber” (GLO, 1892). By then, the road from Ellensburg to Cle Elum was in place. This road crossed the eastern one-half of Section 34. Much later, this road came to be called State Highway 97. The surveyor reported “no timber or brush” near the southern section line of Section 34.

In 1887, the Northern Pacific Railroad was completed from the Kittitas Valley through Stampede Pass and onto Tacoma, a definite advantage for Ellensburg as the headquarters for the Cascade Division. This provided an opportunity to exploit the timber and coal resources along the route. Ellensburg became somewhat of a hub for transportation of goods to Wenatchee and the surrounding areas and could then provide supplies to markets in Puget Sound (Meinig 1968). Hundreds of men were employed to cut and lay timber for railroad ties (Prater 1981) and later bridges across the Columbia River. The population of Ellensburg doubled from 600 to 1,200 in two years after completion of the railroad (Kirk and Alexander, 1990; Oliphant, 1976).

Lumber was also provided for the ever-increasing number of settlers’ homes in the Kittitas Valley. Logging took place in the areas west and north of the Project site. The land around the Project area is too dry to support trees. Sawmills were established in the Kittitas Valley as early as the 1870’s and the annual spring log drives continued until 1915, transporting logs from upland sources to the mills below in Ellensburg and Yakima. The drive was a site to see. Schools and even businesses closed during this spectacular event, so that everyone could go down to the river and watch. Once the dams were completed at the lake outlets near Snoqualmie Pass, restricting spring run-off, the logs could no longer be floated in the Yakima River. Also, more bridges and more irrigation canals were constructed along the way, further inhibiting access. Once railroad lines were connected from high mountain logging areas to the Northern Pacific Railroad, floating was no longer necessary (Henderson, 1990). Logging today is still an economic resource for upland areas and mills in the area.

However, once the railroad was complete, the Snoqualmie Wagon Road was used less and less as a conduit for cattle. The construction of the railroad stimulated settlement of the Kittitas Valley and other areas of eastern Washington. Farming was on the increase and cattle was no longer king. However, improvements continued on the Snoqualmie Wagon Road until the dawning of the age of the automobile. Through continuous use over the years, the road has evolved into what it is today, a major east-west thoroughfare connecting the Kittitas Valley with Puget Sound and all parts east.

Once the automobile was introduced, large-scale changes began to occur in the transportation system. Supported by federal highway legislation and funding, state road construction increased dramatically. Portions of old trails and wagon roads were gradually superimposed by primary state highways. The road referred to as the Ellensburg to Cle Elum Road on the 1892 GLO survey map one day became U.S. Highway 97. The Snoqualmie Wagon Road is now Interstate 90, and the wagon road from Ellensburg to Yakima through the canyon is now Canyon Road.

Interest in large-scale irrigation began as early as 1892 in the Kittitas Valley. Preliminary surveys were conducted by the U.S. Reclamation Service in 1905. The first projects, however, were constructed in the lower Yakima River Valley. Construction didn’t begin in the upper valley until about 20 years later. The Kittitas Reclamation District organized in 1911 so that landowners could secure financing. Water was to come from the reservoirs at Kachess and Keechelus Lakes. World War I put a stop to plans until the federal government finally provided assistance beginning in 1925. A tunnel for the North Branch Canal is located just south of the southern portions of the Project turbine string B. This canal is a branch of the Kittitas Reclamation District

Main Canal irrigation system, constructed between 1926 and 1932. The water intake is on the south bank of the Yakima River just above Easton. The water from this canal irrigates approximately 2,830 acres in the vicinity of Badger Pocket southeast of Ellensburg. The OAHP inventoried this irrigation system in 1985 (Soderberg, 1985).

Hydroelectric dams on the Columbia River were constructed in the 1940s and 1950s. These dams transformed the once raging river into a series of slack-water lakes and monumental power plants to provide irrigation and electricity to the homes and business of the Pacific Northwest. In spite of the great benefits, there have been many losses, particularly to native fisheries. Irrigation put an end to open stock ranges, though farming became progressively more important. The command center at Wanapum Dam, the nearest to the Project area, is connected by computer to all other dams on the Columbia and tracks by the day how much water is released and held behind each dam. An average of 6.5 million gallons of water per minute pass through its turbines to manufacture electricity to be used as far away as Los Angeles. Bonneville Power Administration transmission lines bisect the Project and the whole of the Kittitas Valley, delivering power from dams on the Columbia (Rocky Reach, Wanapum, and Grand Coulee) to Western Washington.

5.1.6.6 Cultural Resources Assessment

5.1.6.6.1 Previous Work and Background Research

Prior to starting fieldwork, on October 14, 2002, Johnson Meninick, Cultural Resources Director of the Yakama Nation, was contacted by Lithic Analysts, by letter, to inform him of the archaeological work to be conducted on the Project. Prior to this letter, the Applicant contacted Mr. Meninick by telephone and certified mail inviting Yakama Nation participation in the cultural resources survey. A response from Mr. Meninick was not received. In addition, David Powell, Ceded Lands Archaeologist for the Yakama Nation, was also contacted by telephone to inform him of the archaeological work to be conducted on the Project. Mr. Powell was invited to visit the Project area during the archaeological survey, but declined.

Lithic Analysts conducted a literature search of the recorded archaeological sites and other archaeological information at the Washington State Office of Archaeology and Historic Preservation (OAHP) in Olympia. All pertinent files concerning investigations of historic and prehistoric resources were reviewed for archaeological information regarding the immediate Project area and the area surrounding the proposed site.

As mentioned above, no previously recorded historic or prehistoric archaeological sites within the Project area were identified during the OAHP literature search or during the few archaeological surveys conducted in and around the Project area. However, there are seven recorded sites (3 prehistoric and 4 historic) within 1.2 miles of the Project area. They include:

- 45KT350, Section 27, T20N, R17E, Swauk Prairie Quadrangle – prehistoric, open lithic scatter;
- 45KT368, Section 5, T19N, R17E, Swauk Prairie Quadrangle – historic, two log cabins with railroad association;
- 45KT545, Section 2, T18N, R17E, Swauk Prairie Quadrangle – prehistoric, lithic scatter, campsite;
- 45KT1754, Section 24, T19N, R17E, Thorp Quadrangle – prehistoric, lithic scatter, campsite;

- 45KT2182, Section 20, T19N, R17E, Thorp Quadrangle – (formerly numbered 19-224, but recently given a Smithsonian number) historic, irrigation pumping equipment;
- 45KT2183, Section 38, T19N, R17E, Thorp Quadrangle – historic, railroad shack 19-223, Kittitas County, Section 20, T19N, R17E, Swauk Prairie Quadrangle – historic structure.

Very little archaeological research has been conducted in the upper Yakima River basin in Kittitas County. Except for those areas within the Bonneville Power Administration (BPA) power line rights-of-way, the Project area has not been previously surveyed for cultural resources. In addition, according to the OAHIP literature search, the Project area does not contain previously recorded prehistoric or historic archaeological sites. However, portions of the surrounding area have been surveyed for cultural resources, and these surveys are detailed below.

In 1990, Eastern Washington University surveyed the Puget Sound Energy Intermountain Transmission Line between Hyak (King County) and Vantage (Kittitas County) (DePuyd 1990). This survey was located several kilometers south to southwest of the proposed Project area along the southwest side of the Yakima River.

Archaeologists from Central Washington University conducted a random archaeological survey of 17 sections found on the Reecer Canyon Quadrangle (Bicchieri 1994). The Reecer Canyon Quadrangle area is situated east of the Project area.

A portion of State Highway 97 north from Section 27, Township 20 North, Range 17 East, was surveyed in 1994 by Eastern Washington University archaeologists at selected Washington State Department of Transportation locations where highway improvements were to be made. (Holstine and Gough, 1994). This highway survey commenced about a two miles northwest of a portion of the Project area located in Section 34 where turbine string G is proposed.

Archaeologists from Historical Research Associates, Inc. (HRA) surveyed the Olympic Pipeline's proposed Cross Cascades Petroleum Products Pipeline for Dames and Moore in 1996 (HRA, 1996). This survey was conducted for a proposed 235-mile underground pipeline to carry petroleum products from western Washington to storage facilities near Ellensburg and Pasco. HRA recorded numerous prehistoric and historic archaeological sites, but none of these recorded archaeological sites are within the proposed Project.

HRA archaeologists conducted another survey in 1998 for the BPA's proposed Seattle-to-Spokane Fiber Optic Cable Project (Thompson, 1998). BPA's Rocky Reach to Maple Valley steel tower transmission line bisects the proposed Project area at turbine strings H (Sec. 2, T19N, R17E) and G (Sec. 34, T20N, R17E). Little ground disturbing activity occurred because most of the cable was installed on existing transmission towers although the cable was buried in six locations throughout the right-of-way. The closest location to the Project area was the Schultz Substation in Section 15, T19N, R18E, several kilometers to the east of the Project area.

5.1.6.6.2 Field Survey and Results

This Project differed from most archaeological surveys in that the areas affected by ground-altering activities will be linear in nature, not large surface parcels. All affected areas were walked in meandering transects by three surface investigators. Ground visibility was

excellent in almost all areas of this Project. Only a few very short lengths of transects were covered by thick grass.

All proposed wind turbine generator strings (A, B, C, D, E, F, G, H, I and J) were covered by three meandering transects each at approximately 100 feet intervals. All existing access roads, new access roads, underground electrical lines, and overhead electrical lines were investigated by approximately 35 feet meandering transects. The areas proposed for the Project substations were surveyed by approximately 35 feet meandering transects also.

Two previously unrecorded prehistoric archaeological sites were identified during this survey. Project Site #1 is located at the north end and to the east of turbine string G, just west of a seep and given its location near water, may have been a lithic scatter. Project Site #2 is located just west of the proposed BPA substation location and just north of the BPA power line right-of-way. This site is a small debitage concentration.

5.1.6.7 Impacts

This archaeological survey project covered the entire areas within the Project where ground-altering activities are proposed. Two small prehistoric sites were identified. Both prehistoric archaeological sites should be avoided to prevent any damage to either site.

A qualified archeologist will monitor ground disturbing activities during the construction process. If a cultural resource feature is encountered, all construction will be halted temporarily in the area of the feature. If human remains/burials are encountered, construction will cease immediately in the area of the burial and the area will be secured and placed off limits for anyone but authorized personnel. The cultural resource monitor will notify any and all authorities concerned with such an inadvertent discovery, specifically including the Yakama Nation. The Yakama Nation has been consulted during the planning process beginning in February of 2002. The Yakama Nation will be notified prior to commencement of construction and will be invited to have representatives present during all ground-breaking activities. It is anticipated that a stipulation will be made with the Yakama Nation establishing procedures to be followed in the event of any finds during construction.

Copies of the report developed for this Project and Site Forms have been forwarded to the Yakama Nation Cultural Resources Director, Johnson Meninick, and to the Washington State Office of Archaeology and Historic Preservation in Olympia.

5.1.7 Agriculture and Crops

As described in above Section 5.1.1.1, land uses in the Project area are predominantly open space and grazing, with some rural residential development occurring in certain locations. There is currently no agricultural activity taking place on any of the parcels where Project facilities are proposed other than grazing. None of the land is irrigated and no crops are grown on these parcels. This area is not highly productive rangeland, and most grazing use is seasonal (spring) in nature. Less than half of the private property owners on whose land Project facilities are proposed currently utilize their land for grazing. All but one of these private property owners graze cattle, the other grazes bison and horses. Less than half of the parcels owned by Washington DNR where turbines are proposed are currently being used for cattle grazing.

During construction of the Project, it will be necessary to remove cattle from those areas where blasting or heavy equipment operations are taking place. Applicant will make arrangements with property owners and livestock owners to keep livestock out of these areas during those periods.

Once the Project is completed, grazing activities can resume as before. The operation of wind turbines is highly compatible with grazing activities. Cattle, sheep, and other domestic animals routinely graze underneath operating wind turbines at projects across the US and around the world. The total area that will be permanently occupied by the Project facilities is 90 acres, much of which is not currently being used for grazing. As part of the proposed mitigation package for plants and animals, the Applicant plans to acquire a parcel of approximately 550 acres and exclude cattle from this parcel in order to restore and enhance its value as habitat. In the context of the very large amount of rangeland available for grazing in Kittitas County, this impact is insignificant.